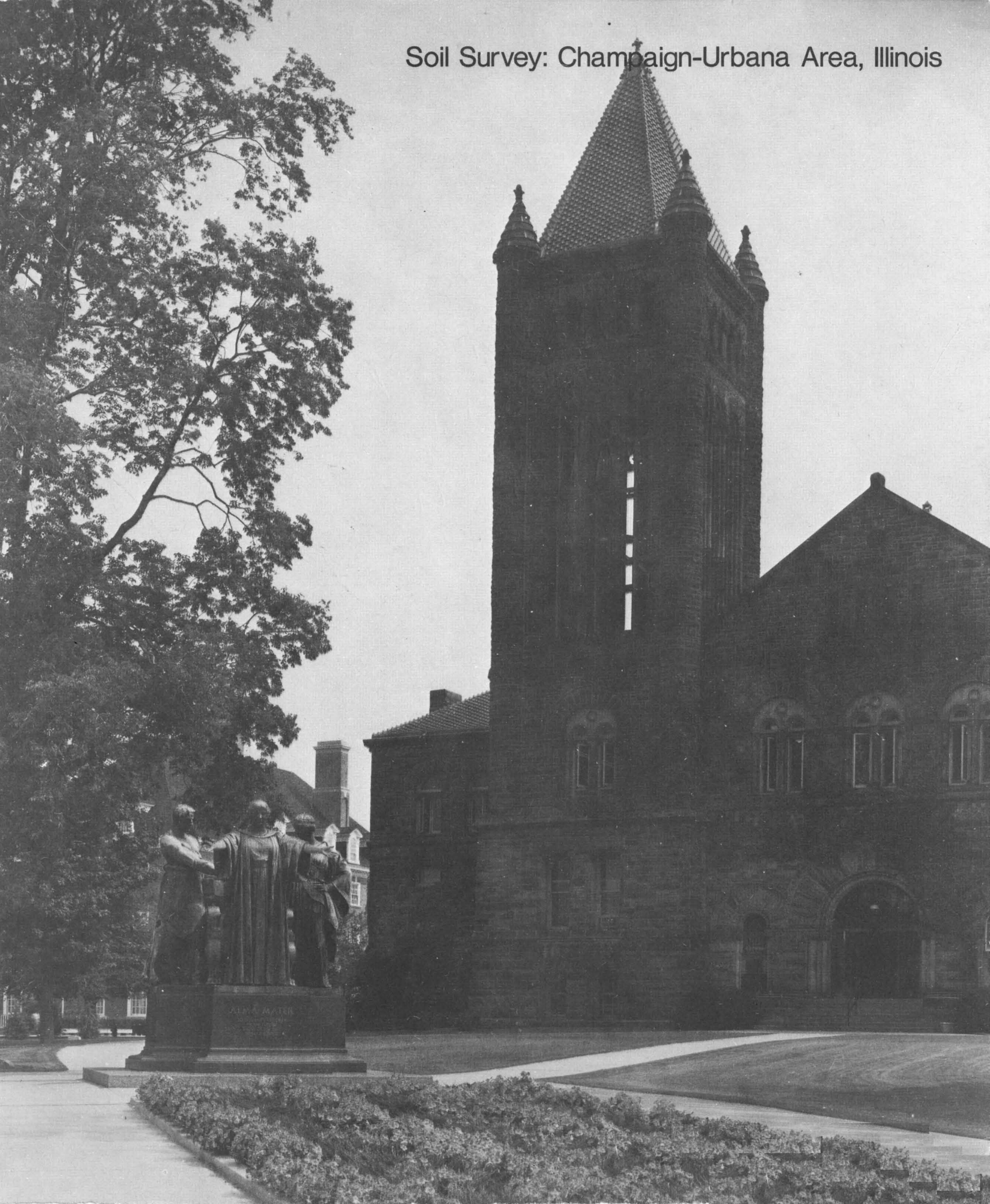
Soil Survey: Champaign-Urbana Area, Illinois



Alumni of the University of Illinois and residents of the Champaign-Urbana area immediately recognize this scene on the Urbana Campus. The famous Alma Mater statue in the center is flanked on the left (behind the trees) by the Illini Union and on the right by Altgeld Hall. The average U. of I. student spends many hours relaxing, studying, or working in student activities in the student union building. The bell tower in Altgeld Hall regularly tolls the hour for area residents, who are also occasionally entertained at noon by melodies played on the bells.

SOIL SURVEY:

SOIL REPORT 100

Report by: J. D. Alexander and J. B. Fehrenbacher, University of Illinois Department of Agronomy, and D. C. Hallbick, Soil Conservation Service, U.S. Department of Agriculture.

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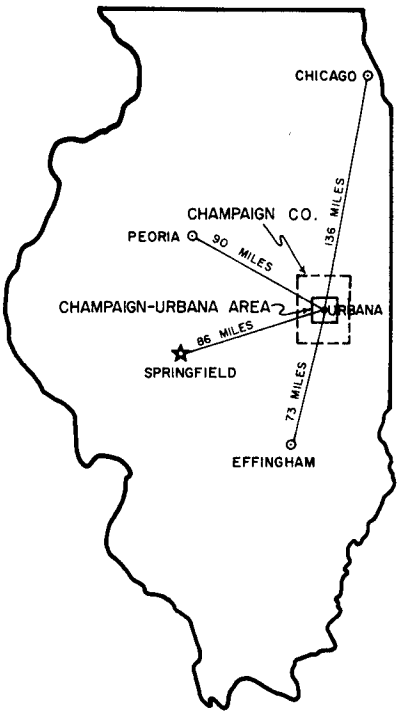
Champaign-Urbana Area, Illinois

University of Illinois at Urbana-Champaign Agricultural Experiment Station in cooperation with the Soil Conservation Service, U.S. Department of Agriculture.

Report and maps published by the University of Illinois Agricultural Experiment Station.



Champaign-Urbana Area

September, 1974 Urbana, Illinois

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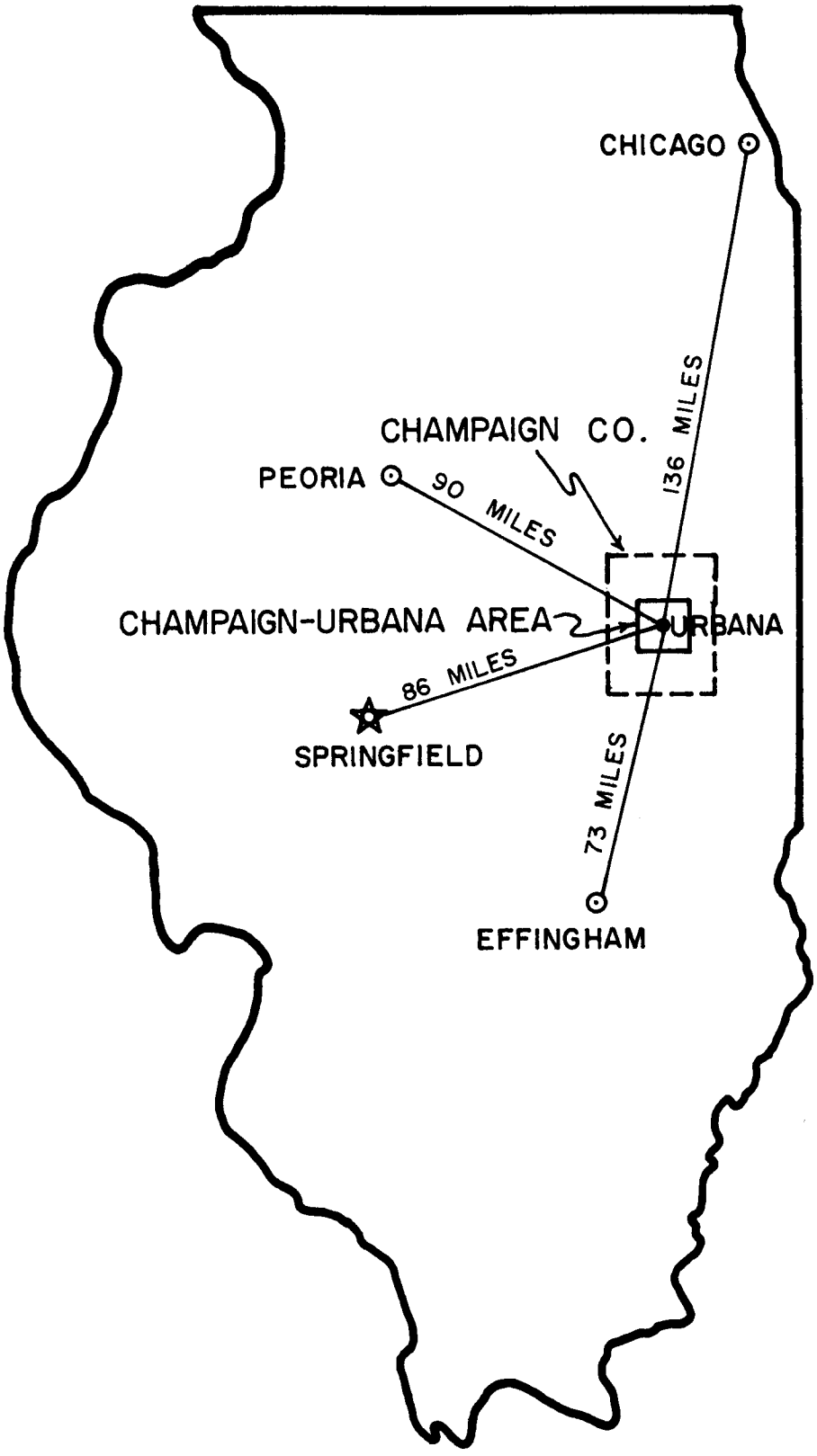
THE SCOPE OF THE REPORT

This report provides information about the soils of the Champaign-Urbana, Illinois area. The accompanying soil maps show the extent and distribution of the various soils and the text gives their characteristics and an interpretation of their various properties for a number of purposes and uses.

Everyone is concerned to some extent with soils - either directly or indirectly. We depend on soils to produce most of our food and fiber. We build our houses, highways, and other structures on soils. In many ways we depend on soils to deactivate wastes and filter undesirable substances from our water supplies. How well our soils perform depends on their natural properties, the kind of use we make of them, and the adequacy of our management and designs in their use.

Soils information is useful in agricultural pursuits such as farm planning and operation, land appraisal, and land purchase, and is also helpful in forest and wildlife management, and is becoming more and more important in urban planning, recreation planning, city and county zoning, tax assessment, and many other activities.

This report is concerned with a 96-square-mile (2 2/3 townships) area in and surrounding the cities of Champaign and Urbana. The center of the area is at the junction of Springfield Avenue and First Street in Champaign. The east and west boundaries are 6 miles east and west, respectively, of First Street and the north and south boundaries are 4 miles north and south of Springfield Avenue. Approximately 25 square miles of the area is within the two cities, including the University of Illinois campus. The area is near the center of Champaign County.



Location of the survey. (Fig. 1)

HOW TO USE THE SOIL MAP AND REPORT

If you are interested in the soils on a particular farm or area, one of the first things to do is to examine the soil map in order to locate the tract of land and determine the soils present. The detailed soil maps in the back of this report are divided into 24 sheets with 4 square miles on each sheet at a linear scale of 4 inches equal to 1 mile. The Index to Soil Map Sheets on pages 8 (Fig.2) or 138 shows the photo index number which covers a specific part of the Champaign-Urbana area. Township, range, and section numbers are given on each map sheet, as well as roads, drainage-ways and other features to help in locating a particular tract of land. The soil map sheets are in the back of the report.

Each soil area shown on the soil map is referred to as a soil mapping unit and contains a symbol to identify it. The symbols have either two or three parts. The first number identifies the soil, the capital letter the slope, and the third number symbol (if present after the slope letter) indicates erosion. If no erosion symbol is shown the soil is uneroded or only slightly eroded. A complete list of these symbols is given in the legend on page 137.

The index to soil mapping units and interpretations is on pages 9 through 12. The soil mapping unit symbols are in numerical order in the left-hand column. The other columns give the page numbers on which various types of information on the mapping unit will be found.

After locating the symbol on a tract of land, turn to the appropriate soil description and study the soil. The soil description gives the important characteristics for the soil horizons in the soil profile useful in identifying the soil and making interpretations of the behavior of that soil when it is used for various purposes.

In studying the soil descriptions, it should be remembered that each soil has a range in properties and that those given are the most typical for the soils of the Champaign-Urbana area.

After the soils have been studied, refer to the soil interpretations. In this report soil interpretations of the behavior of the various soils have been made for agriculture, woodland, engineering, urban development, wildlife, and recreation, playgrounds, parks, etc.

The properties of the soil are used to determine the relative suitability or limitation for many of these specific uses. Ratings are given for the relative degree of suitability or limitation. Limitation ratings are slight, moderate, and severe, and are defined as follows:

Slight - Soils with this rating have properties favorable for the rated use. Soil limitations are minor and can be easily overcome. They may require on-site investigations.

Moderate - Soils with this rating have properties moderately favorable for the rated use. Limitations usually can be overcome or modified with correct planning and careful design. Areas with this rating usually require on-site investigations.

Severe - Soils with this rating have one or more unfavorable soil properties for the rated use. Limitations are difficult and usually costly to overcome or modify. Areas with severe ratings require on-site investigations.

Suitability ratings are good, fair, and poor and are defined as follows:

Good - Soils with this rating have properties that are favorable for the rated use.

Fair - Soils with this rating have properties that are moderately favorable for the rated use. Special planning and management are needed to get satisfactory performance.

Poor - Soils with this rating have properties that, in their natural state, make them unfavorable or unsatisfactory, for the rated use. Extreme and costly measures are usually necessary to overcome these properties.

Interpretations are intended to be used as guides to the behavior of soils for various purposes. For many uses such as construction sites for buildings, engineering structures, etc., detailed investigations of the sites are needed. The interpretations are for soils in the natural state and not for disturbed areas.

Translucent material can be used as an overlay over the soil map and colored to show soils that have the same limitation or suitability. For example, soils with a slight limitation for a given use can be colored green, those with a moderate limitation can be colored yellow, and those with a severe limitation can be colored red.

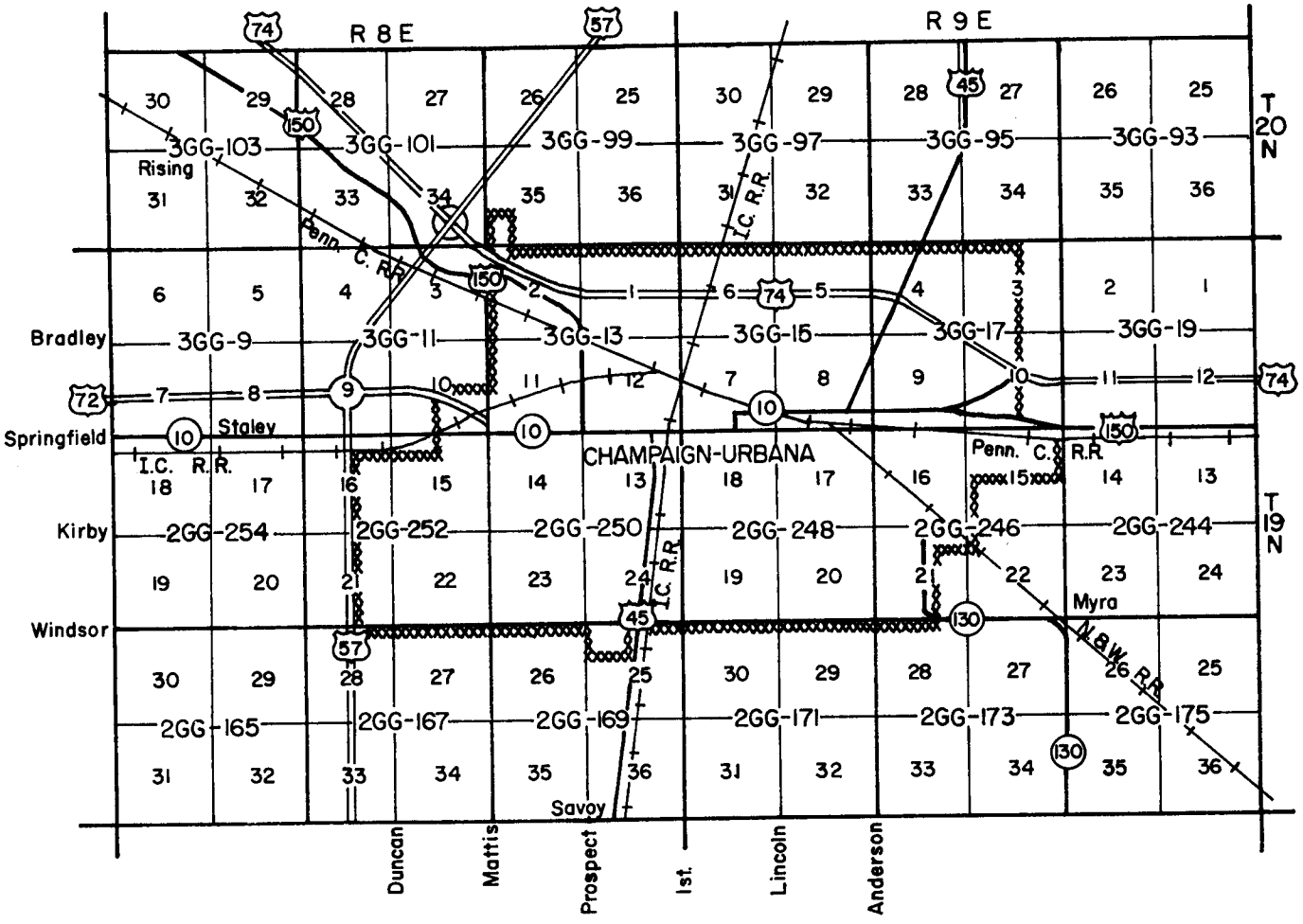
Distribution (acres) of soils by slope and erosion and by native vegetation and landscape position are shown below.

DISTRIBUTION (ACRES) OF SOILS BY SLOPE AND EROSION IN THE CHAMPAIGN-URBANA AREA

	SLOPE						
EROSION	A (0-2%)	B (2-4%)	C (4-7%)	D (7-12%)	E (12-18%)	F (18-30%)	Totals
None to slight	39,514	17,918	1,923	40		35	59,430
Moderate ...		83	621	73	22	28	827
Severe			34				34
Totals	39,514	18,001	2,578	113	22	63	60,291

DISTRIBUTION (ACRES) OF SOILS BY NATIVE VEGETATION AND LANDSCAPE POSITION IN THE CHAMPAIGN-URBANA AREA

	Acres
Upland prairie soils	54,905
Upland paririe - forest transition soils	1,430
Upland forest soils	3,135
Bottomland soils	821
Total	60,291



Index to soil map sheets of the Champaign-Urbana area. (Fig. 2)

Table 1. — Index to Soil Mapping Units, Estimated Acreages, and Soil Interpretations in the Champaign-Urbana Area

Mapping unit symbol	Acres: Mapping unit	Acres: Series	Soil description: Page	Management group: Symbol	Management group: Page	Woodland group: Symbol	Woodland group: Page	Wildlife group: Symbol	Wildlife group: Page	Engineering: Page	Urban development: Page	Recreation: Page
Dodge			43				118		122	105	110	125
24B	211			IIe-1	84	1		1				
24C	122			IIe-1	84	1		2				
24C2	49	382		IIe-1	84	1		2				
Hennepin			50				118		122	106	111	125
25F	35			VIe-1	89	2		4				
25F2	28	63		VIe-1	89	2		4				
Miami			54				118		122	106	111	125
27B	73			IIe-1	84	2		1				
27C	36			IIe-1	84	2		2				
27C2	36			IIe-1	84	2		2				
27D	40			IIIe	87	2		3				
27D2	18			IIIe	87	2		3				
27E2	22	225		VIe-1	89	2		4				
Dana			42				118		122	105	110	125
56B	1,552			IIe-1	84	1		1				
56B2	17			IIe-1	84	1		1				
56C	822			IIe-1	84	1		2				
56C2	320	2,711		IIe-1	84	1		2				
LaRose			52				118		122	106	111	125
60C	10			IIe-1	84	1		2				
60D2	11	21		IIIe	87	1		3				
Harpster			49				118		122	105	111	125
67A	372	372		IIw-1	85	5		7				
Otter			55				118		122	106	111	125
76A	284	284		IIw-2	86	5		10				
Houghton			51				118		122	106	111	125
103A	8	8		IIIw-2	88	5		11				
Virgil			70				118		122	107	112	126
104A	70	70		I-2	84	3		5				
Batavia			35				118		122	105	110	125
105B	61	61		IIe-1	84	1		1				
Sawmill			64				118		122	107	112	126
107A	259	259		IIw-2	86	5		10				
Starks			66				118		122	107	112	126
132A	14	14		IIw-4	87	3		5				

Table 1. — Index to Soil Mapping Units, Estimated Acreages, and Soil Interpretations in the Champaign-Urbana Area (Continued)

Mapping unit symbol	Acres		Soil description	Management group		Woodland group		Wildlife group		Engineering	Urban development	Recreation
	Mapping unit	Series	Page	Symbol	Page	Symbol	Page	Symbol	Page	Page	Page	Page
Camden			40				118		122	105	110	125
134A	51			I-1	83	1		1				
134B	163			IIe-1	84	1		1				
134C	61			IIe-1	84	1		2				
134D2	17	292		IIIe	87	1		3				
Brooklyn			38				118		122	105	110	125
136A	419	419		IIw-3	86	4		8				
Saybrook			65				118		122	107	112	126
145B	717			IIe-1	84	1		1				
145C	231			IIe-1	84	1		2				
145C2	86	1,034		IIe-1	84	1		2				
Proctor			59				118		122	106	111	126
148A	70			I-1	83	1		1				
148B	345			IIe-1	84	1		1				
148C	96			IIe-1	84	1		2				
148C2	18	529		IIe-1	84	1		2				
Brenton			37				118		122	105	110	125
149A	111			I-2	84	3		5				
149B	25	136		IIe-2	85	3		6				
Drummer			44				118		122	105	110	125
152A	24,163	24,163		IIw-1	85	5		7				
Flanagan			47				118		122	105	110	125
154A	8,384			I-2	84	3		5				
154B	8,361	16,745		IIe-2	85	3		6				
Catlin			41				118		122	105	110	125
171B	2,608			IIe-1	84	1		1				
171C	443	3,051		IIe-1	84	1		2				
Elburn			45				118		122	105	110	125
198A	2,977			I-2	84	3		5				
198B	875	3,852		IIe-2	85	3		6				
Plano			58				118		122	106	111	125
199A	247			I-1	83	1		1				
199B	1,096	1,343		IIe-1	84	1		1				
Ward			71				118		122	107	112	126
207A	60	60		IIw-3	86	4		8				

Table 1. — Index to Soil Mapping Units, Estimated Acreages, and Soil Interpretations in the Champaign-Urbana Area (Continued)

Mapping unit symbol	Acres		Soil description	Management group		Woodland group		Wildlife group		Engineering	Urban development	Recreation
	Mapping unit	Series	Page	Symbol	Page	Symbol	Page	Symbol	Page	Page	Page	Page
Parr			55				118		122	106	111	125
221B	35			IIe-1	84	2		1				
221C	13			IIe-1	84	2		2				
221C2	52			IIe-1	84	2		2				
221C3	34			IIIe	87	2		2				
221D2	27	161		IIIe	87	2		3				
Birkbeck			36				118		122	105	110	125
233A	66			I-1	83	1		1				
233B	388			IIe-1	84	1		1				
233B2	38			IIe-1	84	1		1				
233C	14			IIe-1	84	1		2				
233C2	12	518		IIe-1	84	1		2				
Sunbury			67				118		122	107	112	126
234A	488			I-2	84	3		5				
234B	573	1,061		IIe-2	85	3		6				
Sabina			62				118		122	106	112	126
236A	730			I-2	84	3		5				
236B	406	1,136		IIe-2	85	3		6				
Kendall			51				118		122	106	111	125
242A	108			IIw-4	87	3		5				
242B	11	119		IIe-2	85	3		6				
St. Charles			63				118		122	107	112	126
243A	11			I-1	83	1		1				
243B	79	90		IIe-1	84	1		1				
Xenia			72				118		122	107	112	126
291B	83	83		IIe-1	84	1		1				
Russell			61				118		122	106	112	126
322B	66			IIe-1	84	1		1				
322B2	28			IIe-1	84	1		1				
322C	75			IIe-1	84	1		2				
322C2	48	217		IIe-1	84	1		2				
Peotone			57				118		122	106	111	126
330A	327	327		IIIw-1	88	5		8				
Toronto			69				118		122	107	112	126
353B	24	24		IIe-1	84	3		6				

Table 1. — Index to Soil Mapping Units, Estimated Acreages, and Soil Interpretations in the Champaign-Urbana Area (Concluded)

Mapping unit symbol	Acres: Mapping unit	Acres: Series	Soil description: Page	Management group: Symbol	Management group: Page	Woodland group: Symbol	Woodland group: Page	Wildlife group: Symbol	Wildlife group: Page	Engineering: Page	Urban development: Page	Recreation: Page
Atlanta			34				118		122	105	110	125
385B	131	131		IIe-1	84	1		1				
Lawson			53				118		122	106	111	125
451A	278	278		IIw-2	86	5		9				
Raub			60				118		122	106	111	126
481A	17			I-2	84	3		5				
481B	16	33		IIe-2	85	3		6				
Fincastle			46				118		122	105	110	125
496B	19	19		IIe-1	84	3		6				
Other land: borrow pits, gravel pits, made land, interstate highways, etc.		1,149										

61,440 = Total estimated acres in the Champaign-Urbana Area.

GENERAL FEATURES OF THE CHAMPAIGN-URBANA AREA

Physiography and Drainage

The physiography of the area reflects the nature of ice-deposited glacial features. All of the Champaign-Urbana area is located in the Bloomington Ridged Plain within the Till Plain Section of the Central Lowland Province (Leighton et al., 1948).

The Bloomington Ridged Plain consists mainly of Woodfordian glacial till of Wisconsinin age and is characterized by low, broad, moranic ridges with intervening wide stretches of relatively flat or gently undulating moraines. It was in the Bloomington Ridged Plain that the grass-covered stretches of rolling prairie and extensive swamps, described by the early settlers, were most typically and extensively developed.

The most extensive moraine in the Champaign-Urbana area is the Champaign moraine extending northwest from Champaign-Urbana to Mahomet and beyond. Other moraines (Figure 3) in the survey area are the Pesotum, West Ridge, Urbana, and Hildreth (Wilman and Frye, 1970). Both the Champaign and Pesotum moraines have extensive outwash plains adjacent to their front slopes.

In some areas the Champaign moraine rises 100 to 125 feet above the associated outwash plain. Most of the other moraines have elevation differences of 50 feet or less.

Three major streams have their headwaters in the survey area. The Kaskaskia River starts at the base of the Champaign moraine in the western part of the survey area and terminates in the Mississippi River in Randolph County, Illinois. The Embarras River starts at the base of the Champaign moraine in the south central part of the survey area and flows south-southeast joining the Wabash river in

Lawrence County, Illinois. The West Branch of the Salt Fork River flows more or less east into the Vermillion River which empties into the Wabash River in Indiana about 15 miles southeast of Danville, Illinois.

Maximum elevation in the Champaign-Urbana area is about 850 feet above mean sea level located in the northwest part of section 28, T20N, R8E. Lowest elevation is about 685 feet in the very southwest part of the survey area along the Kaskaskia River (T19N, R8E, Sec. 31). The Embarras River exits the survey area at an elevation of about 690 feet.

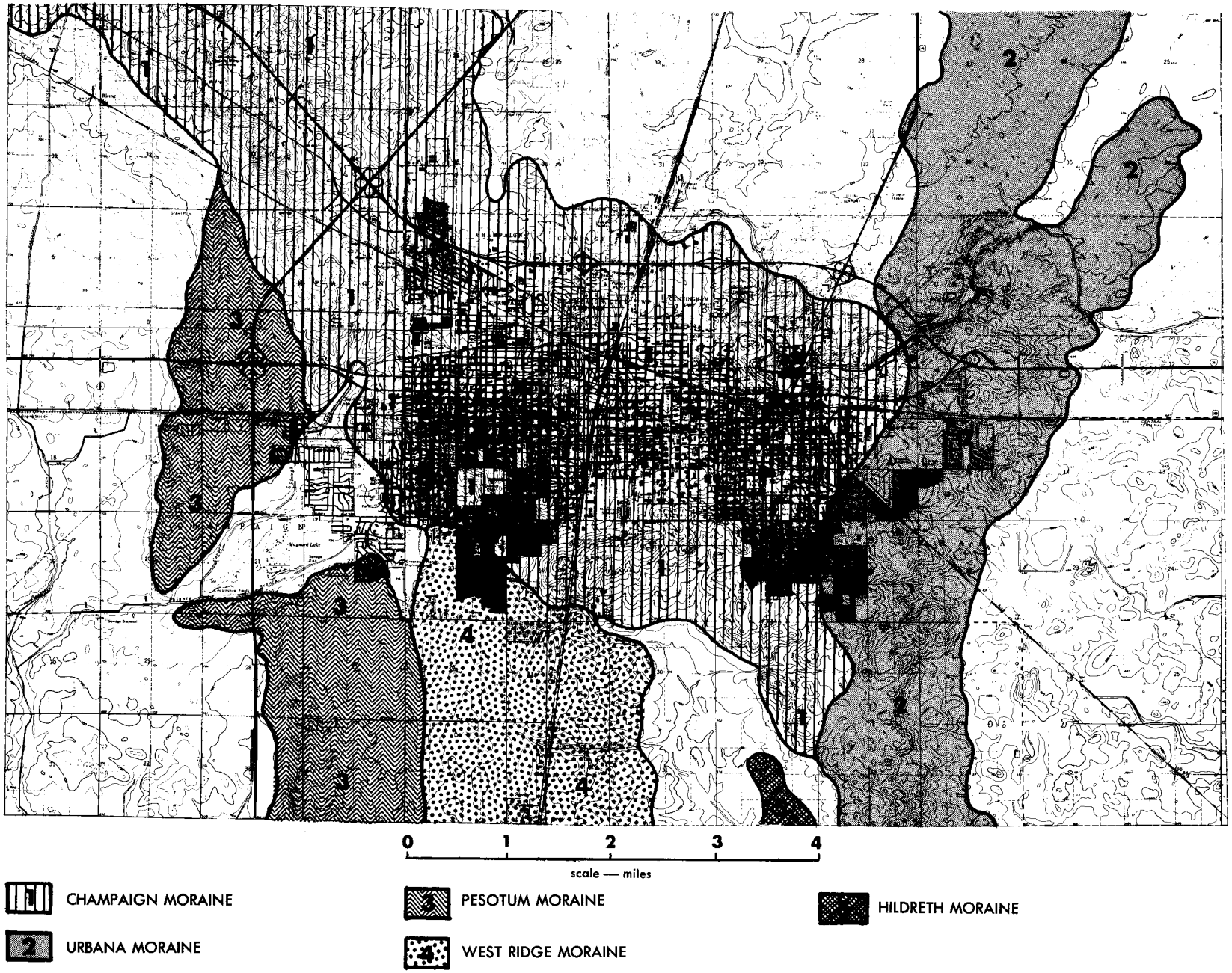
Geology

The Champaign-Urbana area lies within the area of North America that was covered by continental glaciers during the Ice Age or Pleistocene. Three of the four major glacial stages covered the survey area. Glacial drift from the Kansan stage lies buried deeply by materials from the Illinoian stage, and finally the glacial drift of Wisconsinan stage lies uppermost. The moraines of the Wisconsinan stage are shown in Figure 3 (Willman and Frye, 1970).

The total thickness of glacial drift in the survey area ranges from about 100 feet in the southeast corner to about 400 feet near the northwest part. Illite is the dominant clay mineral in the glacial till.

A covering of loess or wind-blown silt blankets the entire area with average thickness in the 40- to 60-inch range.

The foregoing comments concerning the geology of the Champaign-Urbana area are very brief. For more details concerning both ice-age and hard-rock geology consult the Illinois State Geological Survey, Urbana, Illinois.



Glacial moraines in the Champaign-Urbana area (Williams and Frye, 1970). (Fig. 3)

Climate

The Champaign-Urbana area has a continental climate with hot summers and cold winters. Low pressure areas and associated weather fronts traveling mostly west to east bring frequent changes in temperatures, humidity, cloudiness, and wind direction during much of the year.

Winds are mostly from the southwest, west, and northwest. Summer winds are generally from the southwest and winter winds generally from the northwest.

January is normally the coldest month and July the hottest month (Table 2) with mean monthly temperatures of about 26° F and 75° F, respectively.

Winter precipitation is about 6 inches, spring 11 inches, summer 10 inches, and fall 9 inches. The average annual precipitation at Urbana from 1889 to 1946 was 35.65 inches with the precipitation over the growing season of April 1 to September 30 being 20.85 inches.

Average length of growing season is 180 days. Average date of last killing frost in spring is April 21 and average date of first killing frost in fall is October 18.

For more detailed weather and climate information contact the Illinois State Water Survey Division weather observer, Champaign, Illinois.

CULTURAL ASPECTS

Land Use

Land use in the Champaign-Urbana area is essentially urban and agricultural. The urban use comprises the cities of Champaign, Urbana, and adjacent housing developments.

Table 2. — Temperature and Precipitation in January and July in the Champaign-Urbana Area

Year	JANUARY				JULY			
	Mean Precip.	Temperature			Mean Precip.	Temperature		
		Max	Min	Mean		Max	Min	Mean
	inches	°F	°F	°F	inches	°F	°F	°F
1964	1.89	39.2	22.0	30.6	2.41	85.6	65.8	75.7
1965	4.13	36.7	18.5	27.6	5.12	83.4	63.5	73.5
1966	.45	29.7	14.0	21.9	1.34	90.2	67.1	78.7
1967	3.45	37.0	21.3	29.8	2.66	83.1	62.1	72.5
1968	3.66	31.0	16.1	23.5	2.83	84.3	64.3	74.3
1969	4.27	30.3	16.2	23.2	2.98	87.1	67.6	77.3
1970	1.28	25.9	10.4	18.1	4.58	85.1	64.2	74.7
1971	1.45	31.5	14.1	22.8	10.96	81.7	62.0	71.9
1972	1.80	32.9	16.2	24.6	2.58	83.5	64.5	74.0
1973	1.13	36.8	22.7	29.8	9.21	86.0	66.4	76.2
Mean (Last 10 years)	2.35	33.1	17.2	25.2	4.47	85.0	64.8	74.9
Mean (1889-1946)	2.06	34.6	18.8	26.8	3.09	86.4	63.9	75.3

Of the 96 square miles in the survey area about 31 square miles were in urban development in 1973, with the remaining 65 square miles essentially in agriculture.

The urban land use consists mainly of residential housing, shopping areas, some industry and the University of Illinois to the south of Champaign-Urbana.

Most of the agricultural land surrounding the Champaign-Urbana area is used for the production of grain crops, primarily corn and soybeans. Although there are some livestock feeding operations in the area, cash grain farming is most extensive.

Transportation

The Champaign-Urbana area has most means of transportation available to it. The University of Illinois Willard Airport, just south of Savoy, serves the area with commercial airlines.

The main line of the Illinois Central-Gulf railroad from Chicago to New Orleans passes through Champaign. Other rail lines in the area are the New York Central and the Wabash.

Two major interstate highways, I-57 and I-74, intersect just west of Champaign. Other federal highways servicing the area are U.S. Routes 150 and 45. I-72 proceeds west from I-57 to near Monticello. Most of the secondary county and township roads have been black-topped.

Population

The population in the Champaign-Urbana area was about 100,000 in 1970 with a predicted population in 1980 of about 110,000 (Champaign County Regional Planning Commission, 1973).

Residential

Most of the homes in the urban areas are one family residences along with a fairly large number of apartment complexes used in large part by persons associated with the University of Illinois and allied State and Federal agencies. The University of Illinois maintains a large number of dorms and apartments for students, faculty, and staff on its campus.

Industrial and Commercial

The Champaign-Urbana area relies mainly on non-industrial and commercial activities (e.g., University of Illinois) for its economic well being. Among industries now located in the area are soybean extraction and processing plants and metal processing plants.

Major commercial areas are the downtown areas of both Champaign and Urbana along with several existing and proposed shopping centers and malls. Several large commercial, industrial, residential, and highway construction firms are located in the survey area (Champaign County Planning Commission, 1973).

Recreation

Parks and playgrounds located in various areas within the residential areas of both Champaign and Urbana contain tennis courts, ball fields, and playground equipment in addition to open area recreational space. Other outdoor recreation areas are located within short driving distance of the survey area.

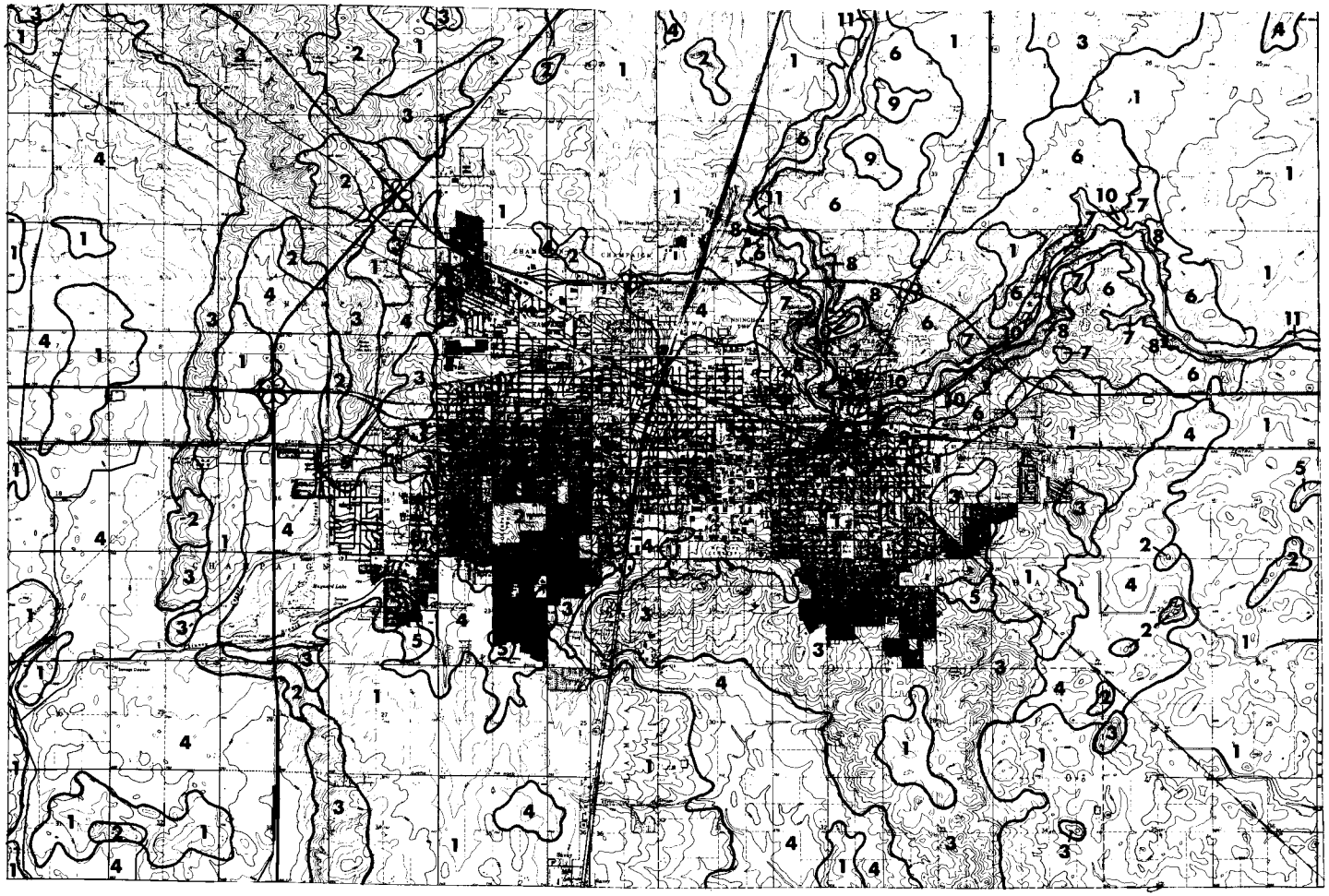
GENERAL SOIL AREAS OF THE CHAMPAIGN-URBANA AREA

The location and extent of the 11 soil association areas in the Champaign-Urbana area are shown in the accompanying general soil map (page 21). A soil association is a landscape that has a distinct proportional pattern of soils normally consisting of two or three major soils and at least one or more soils of lesser extent.

This type of soils information is for those who are interested in a broad picture of the soil resources and soil conditions of the entire survey area. It is useful in comparing soils in different parts of the area and in locating larger tracts of land that may be suitable for specific purposes. When planning or managing individual farms or small tracts of land, the detailed soil map should be consulted because the individual soils within one soil association area will ordinarily differ in slope, erosion, drainage, and other characteristics that affect management.

The 11 soil associations in the Champaign-Urbana area are described in this section. More detailed information about individual soils in each association can be obtained by studying the detailed soil maps in the back of this report and by reading the section "Descriptions of Champaign-Urbana Soils". The name of each soil association consists of the names of the two or three soil series which are most extensive in the association with the most extensive listed first followed by soils less extensive in descending order of importance.

Loess, glacial till, and glacial outwash are prominent parent materials in the survey areas. Normally 40 to 60 inches of loess overlies either loam textured glacial till (Wascher et al., 1960) or loamy stratified glacial outwash. On some steeper slopes the loess thickness will be less than 40 inches. Loess is material carried by the wind, composed largely of silt-size particles with 2 to 6 percent sand and usually less than 10 percent clay (Fehrenbacher et al., 1968).



NO.	SOIL ASSOCIATION	NO.	SOIL ASSOCIATION	NO.	SOIL ASSOCIATION
1	Drummer-Flanagan	5	Proctor-Drummer-Brenton	9	Kendall-St. Charles
2	Catlin-Drummer-Flanagan	6	Sabina-Sunbury-Birkbeck	10	Camden-Starks
3	Dana-Drummer-Saybrook	7	Dodge-Russell-Miami	11	Otter-Lawson-Sawmill
4	Drummer-Elburn-Plano	8	Hennepin-Miami		

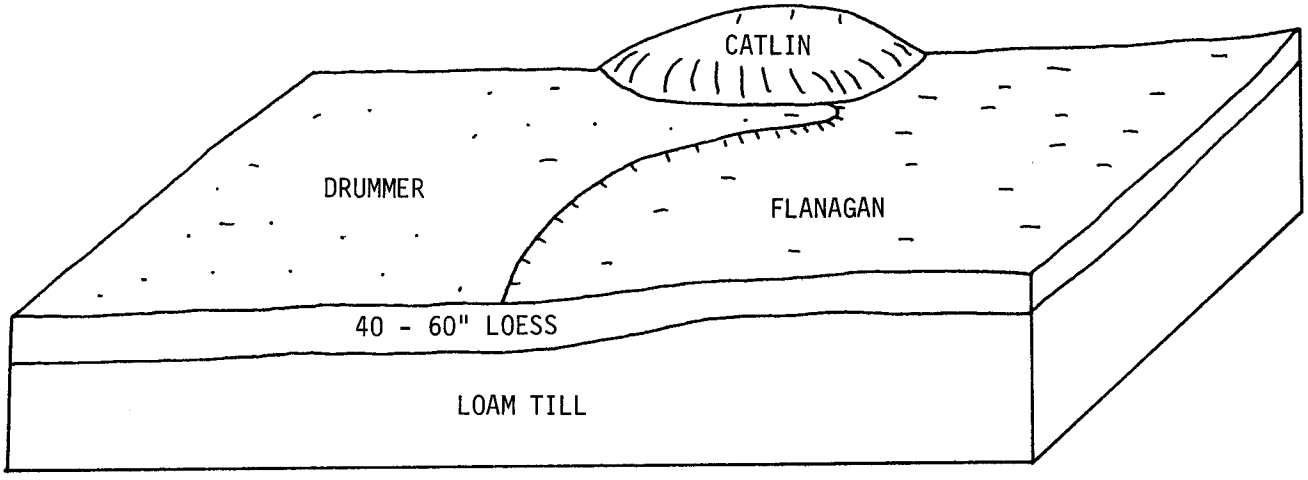
General soil map of the Champaign-Urbana area. (Fig. 4)

Area 1 Drummer-Flanagan Association

Soil association 1 occurs in upland positions principally in the eastern three-fourths of the survey area, with smaller areas occurring in all parts of the survey area.

The major soils in this association (Drummer and Flanagan) are developed in 40 to 60 inches of loess over loam glacial till on mostly level to very gently sloping topography. The soils are dark colored, developed under prairie native vegetation.

This soil association occupies about 45 percent of the survey area and is the most extensive soil association. It is about 45 percent Drummer soils, 45 percent Flanagan soils and 10 percent other soils such as Catlin, Peotone, Harpster, and Dana. Drummer soils occupy the lower portions in the landscape and Flanagan the nearly level to intermediate slopes. For more information on individual soils see the section, "Descriptions of Champaign-Urbana Area Soils", in this report.



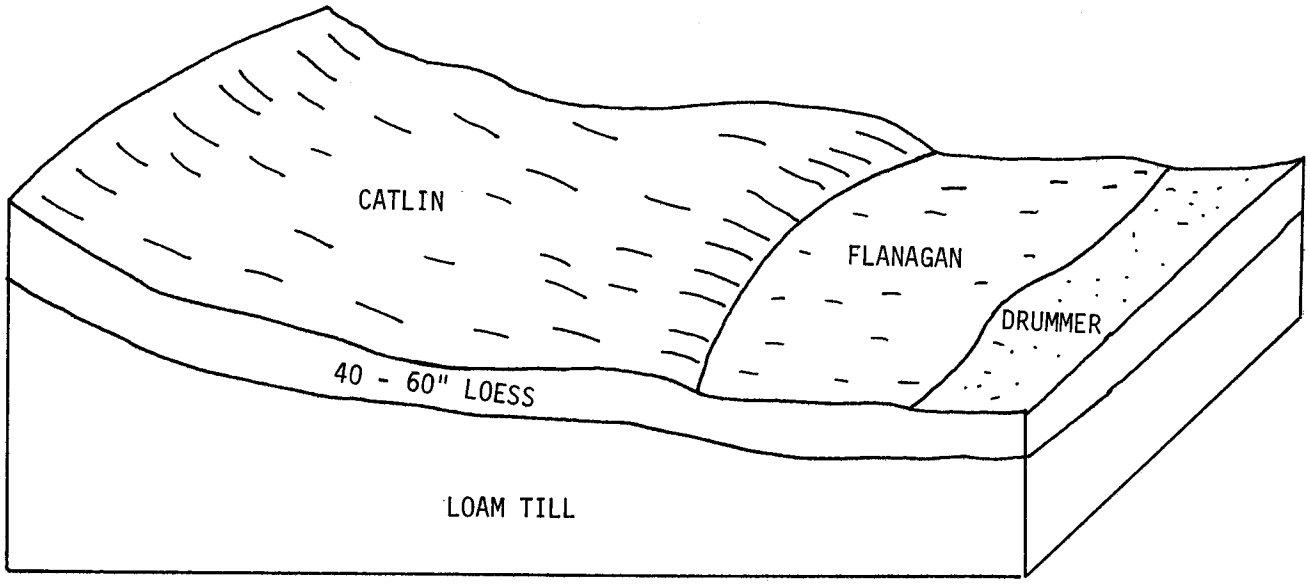
Parent material and landscape position of major soils in Soil Association 1. (Fig. 5)

Area 2 Catlin-Drummer-Flanagan Association

Soil Association 2 occurs in upland positions principally on the Champaign moraine in the western part of the survey area.

The major soils in this association (Catlin, Flanagan, and Drummer) are developed in 40 to 60 inches of loess over loam glacial till mostly on very gently sloping to gently sloping topography. They are dark-colored soils developed under prairie native vegetation.

This soil association occupies about 4 percent of the survey area. It is about 40 percent Catlin soils, 25 percent Drummer soils, 15 percent Flanagan soils, and 10 percent other soils such as Saybrook and Dana. Catlin soils are moderately well to well drained occurring on the gently sloping to very gently sloping areas. The poorly drained Drummer soils occur along drainageways and in the lower positions on the landscape. The somewhat poorly drained Flanagan soils are found on the very gently sloping areas. For more information on individual soils see the section, "Descriptions of Champaign-Urbana Area Soils", in this report.



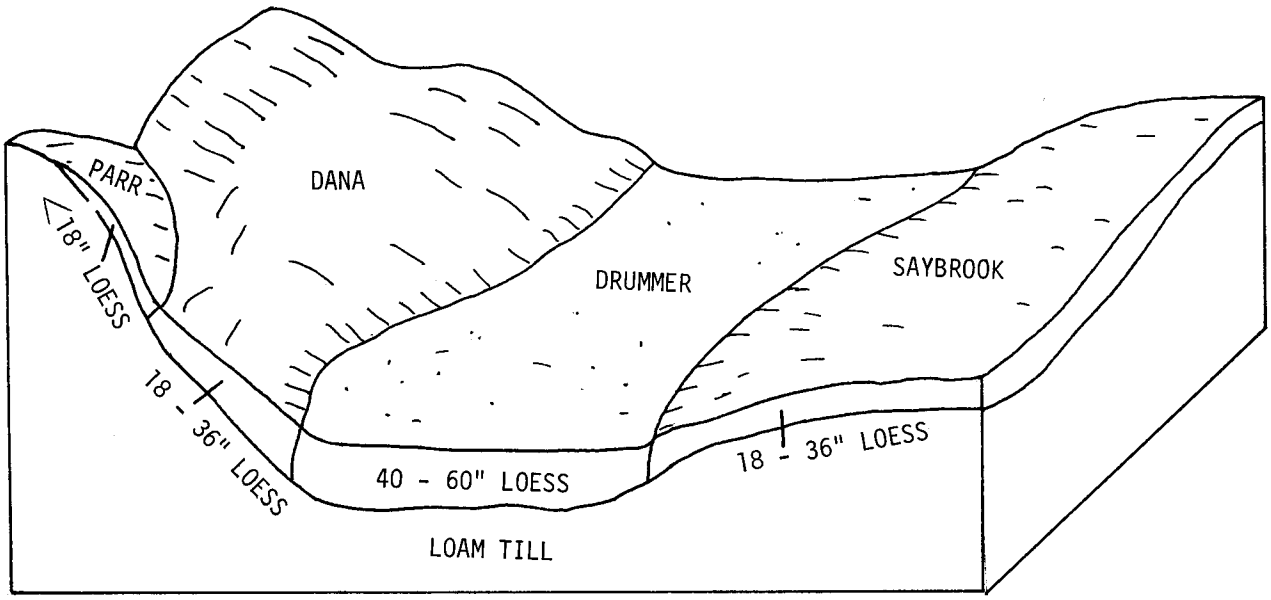
Parent material and landscape position of major soils in Soil Association 2. (Fig. 6)

Area 3 Dana-Drummer-Saybrook Association

Soil association 3 occurs in upland positions principally on the Champaign moraine and along the more sloping portion of the Pesotum moraine in the southern and western parts of the survey area.

The major soils in the association (Dana, Drummer and Saybrook) are developed in 18 to 40 inches of loess over loam glacial till mostly on very gently sloping to gently sloping topography. They are dark-colored soils developed under prairie native vegetation.

This soil association occupies about 13 percent of the survey area. It is about 35 percent Dana soils, 30 percent Drummer soils, 15 percent Saybrook soils and 20 percent other soils such as Catlin, Flanagan, Parr, and Raub. Dana soils are moderately well drained, occurring on very gently and gently sloping areas and are leached to greater than 40 inches. The poorly drained Drummer soils occur along drainageways and in the lower positions on the landscape. The moderately well- to well-drained Saybrook soils are similar to the Dana soils except they are calcareous slightly above 40 inches. For more information on individual soils see the section, "Descriptions of Champaign-Urbana Area Soils", in this report.



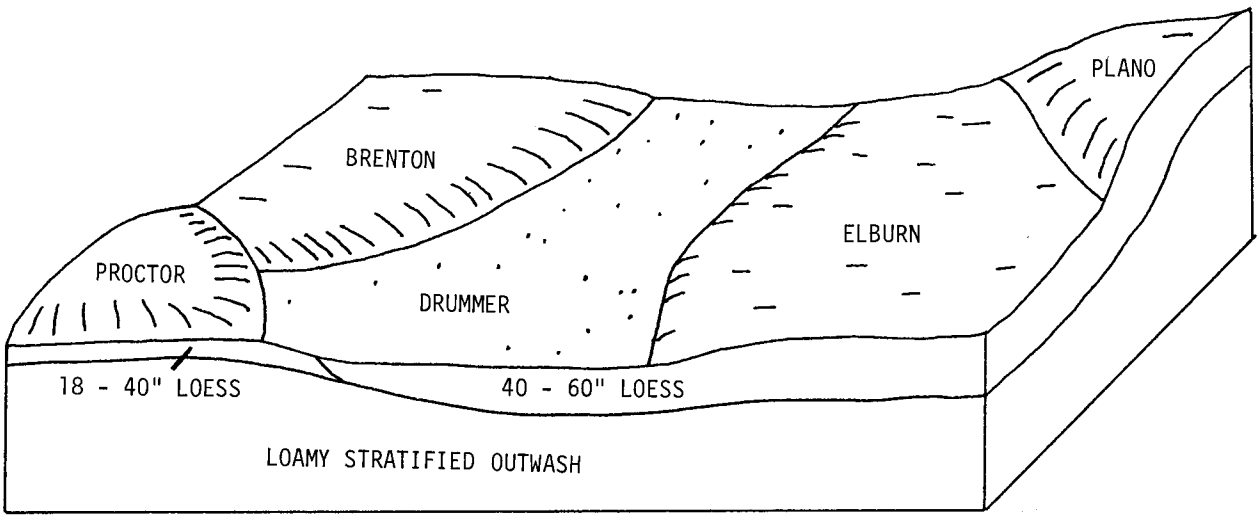
Parent material and landscape position of major soils in Soil Association 3. (Fig. 7)

Area 4 Drummer-Elburn-Plano Association

Soil association 4 occurs in upland outwash plains associated with the Champaign and Pesotum moraines in the western and southern part of the survey area.

The major soils in the association (Drummer, Elburn, and Plano) are developed in 30 to 60 inches of loess over loamy stratified outwash on mostly nearly level topography with some gently sloping areas. They are dark-colored soils developed under prairie native vegetation.

This soil association occupies about 26 percent of the survey area. It is about 55 percent Drummer soils, 25 percent Elburn soils, 10 percent Plano soils, and 10 percent other soils such as Proctor, Brenton, Brooklyn, Peotone, and Harpster. The poorly drained Drummer soils occur along the drainageways and in the lower positions on the landscape. The somewhat poorly drained Elburn soils occur on the nearly level to very gently sloping areas. The moderately well- to well-drained Plano soils occur on very gently sloping areas. For more information on individual soils see the section, "Descriptions of Champaign-Urbana Area Soils", in this report.



Parent material and landscape position of major soils in Soil Associations 4 and 5. (Fig. 8)

Area 5 Proctor-Drummer-Brenton Association

Soil association 5 is of minor extent and occurs in upland outwash plains associated principally with the Champaign moraine.

The major soils in the association (Proctor, Drummer, and Brenton) are developed in less than 40 inches of loess or silty material over stratified loamy outwash on mostly level topography with some very gently sloping. They are dark-colored soils developed under prairie native vegetation.

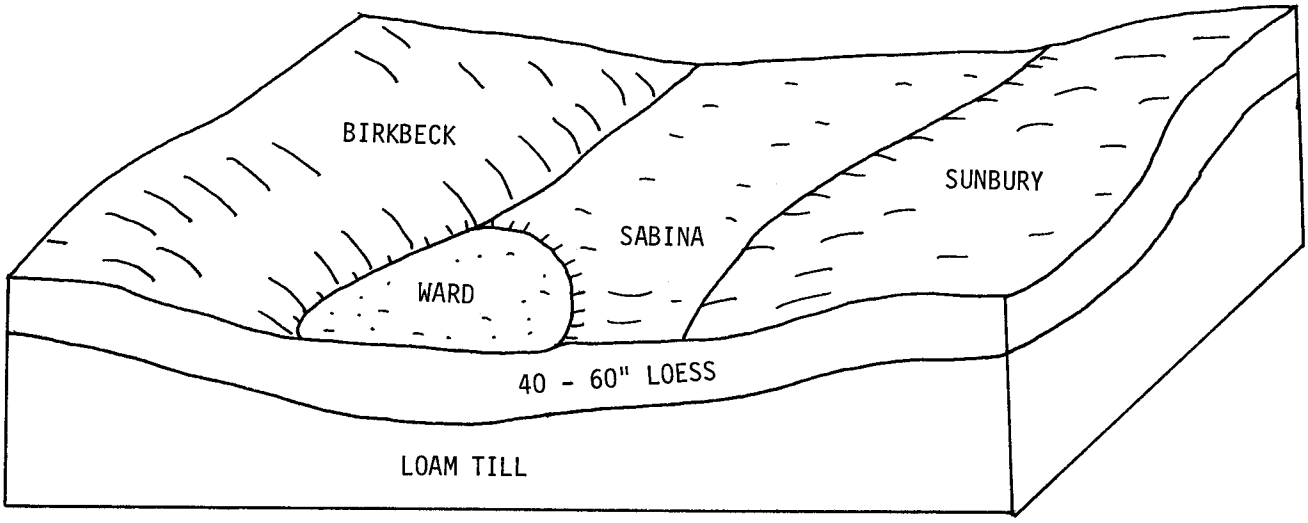
This soil association occupies less than 1 percent of the survey area. It is about 40 percent Proctor soils, 30 percent Drummer soils, 20 percent Brenton soils and 10 percent other soils such as Elburn, Brooklyn and Peotone. The well- to moderately well-drained Proctor soils occur on the very gently to gently sloping areas. The poorly drained Drummer soils occur along drainageways and in the lower positions on the landscape. The somewhat poorly drained Brenton soils occur on nearly level to very gently sloping areas. For more information on individual soils see the section, "Description of Champaign-Urbana Area Soils", in this report.

Area 6 Sabina-Sunbury-Birkbeck Association

Soil association 6 occurs in upland positions along the Salt Fork River in the northeast part of the survey area.

The major soils in the association (Sabina, Sunbury, and Birkbeck) are developed in 40 to 60 inches of loess over loam glacial till on nearly level to very gently sloping topography. They are light colored, for the most part, with some soils being moderately dark. The soils with light surface colors were developed under forest native vegetation and those that are moderately dark colored were developed under mixed prairie-forest native vegetation.

This soil association occupies about 7 percent of the survey area. It is about 25 percent Sabina soils, 25 percent Sunbury soils, 15 percent Birkbeck soils, and 15 percent other soils such as Drummer, Russell, Atlanta, and Ward. The somewhat poorly drained Sabina soils occur on nearly level to very gently sloping area. The Sunbury soils occur on nearly level to very gently sloping areas as transitional soils between the timber and the prairie derived soils. The Birkbeck soils are moderately well to well drained and occur for the most part on very gently sloping to gently sloping topography. For more information on individual soils see the section, "Descriptions of Champaign-Urbana Soils", in this report.



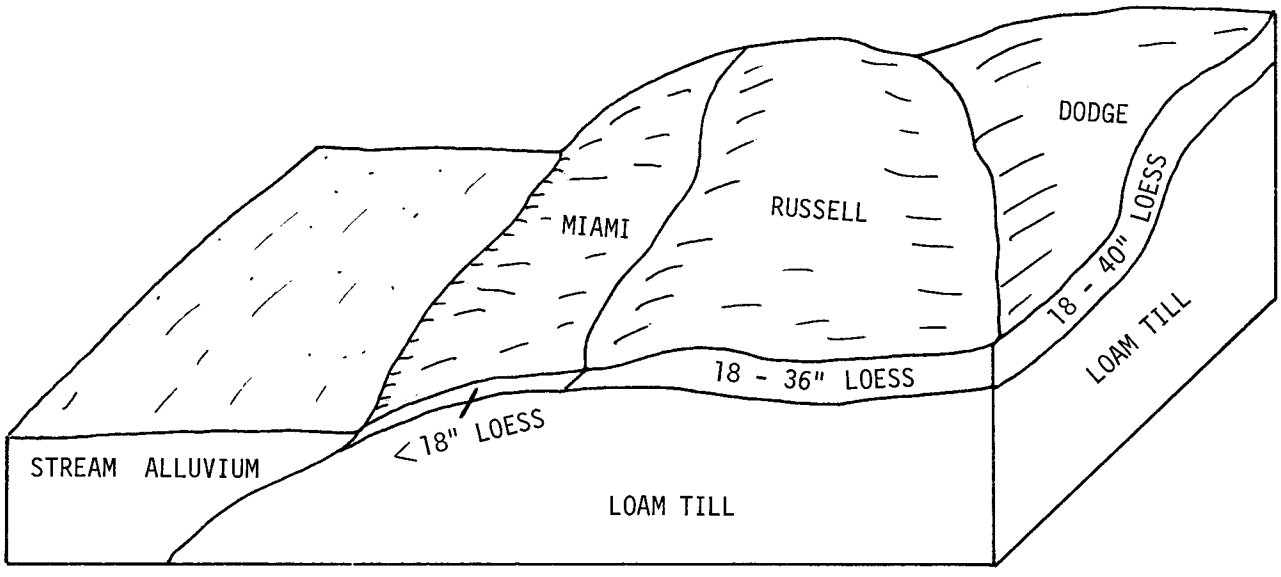
Parent material and landscape position of major soils in Soil Association 6. (Fig. 9)

Area 7 Dodge-Russell-Miami Association

Soil association 7 is of minor extent and occurs in upland positions along the Saline Branch Drainage Ditch in the northeast part of the survey area.

The major soils in this association (Dodge, Russell, and Miami) are developed mostly in 18 to 40 inches of loess over loam glacial till on gently sloping to very gently sloping topography. About one-third of the Miami soils are moderately to strongly sloping. The Miami soils are developed in less than 18 inches of loess over loam glacial till. All these are light-colored soils developed under forest native vegetation.

This soil association occupies about 1 percent of the survey area. It is about 40 percent Dodge soils, 20 percent Russell soils, 20 percent Miami soils, and 20 percent other soils such as Sabina, Atlanta, and Fincastle. The Dodge soils are well drained and occur on gently to very gently sloping areas. The well-drained Russell soils occur on mostly gently sloping areas and the well-drained Miami soils are found mostly on the gently to moderately sloping areas. For more information on individual soils see the section, "Description of Champaign-Urbana Area Soils", in this report.



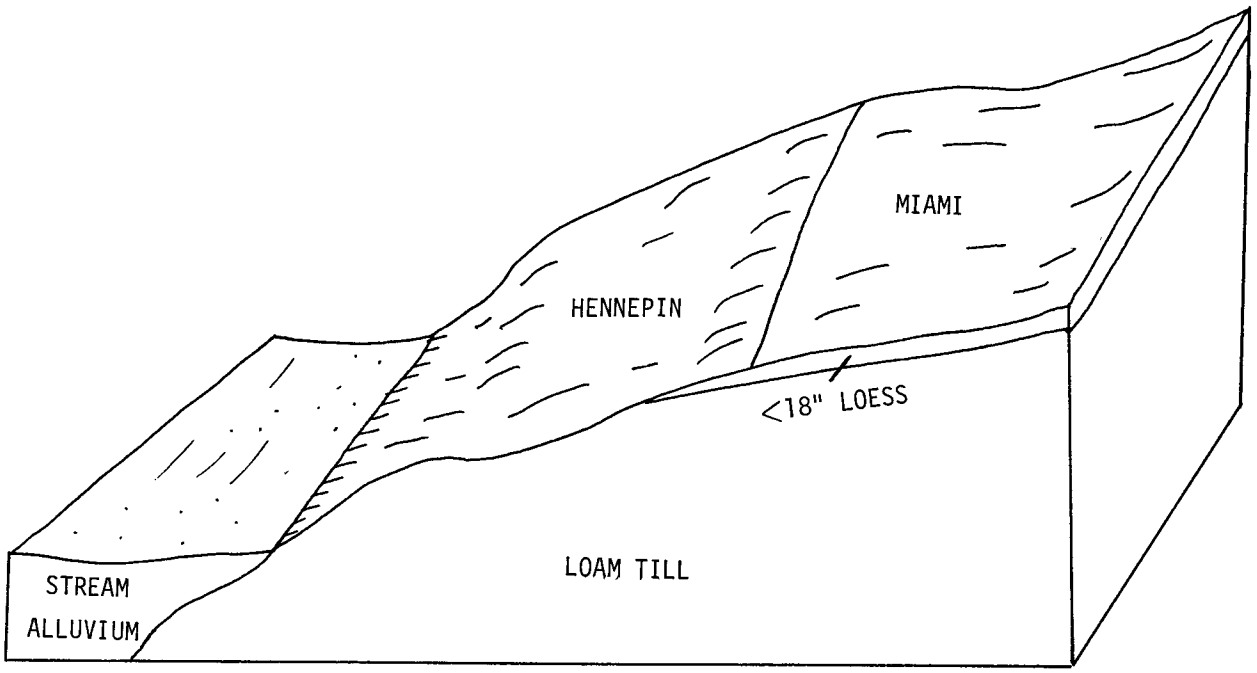
Parent material and landscape position of major soils in Soil Association 7. (Fig. 10)

Area 8 Hennepin-Miami Assocation

Soil association 8 is of minor extent and occurs in upland positions as the steeper slopes adjacent to the Saline Branch Drainage ditch (Salt Fork River) in the northeast part of the survey area.

The major soils in the area (Hennepin and Miami) are developed in none to less than 18 inches of loess over loam glacial till on moderately sloping to moderately steep topography. These are light-colored soils developed under forest native vegetation.

This soil association occupies less than 1 percent of the survey area. It is about 30 percent Hennepin soils, 25 percent Miami soils, and 45 percent other soils such as Birkbeck, Russell, Dodge and Camden. The well drained Hennepin soils occur on moderately steep slopes, while Miami soils occur on slopes ranging from very gently to strongly sloping. For more information on individual soils see the section, "Descriptions of Champaign-Urbana Area Soils", in this report.



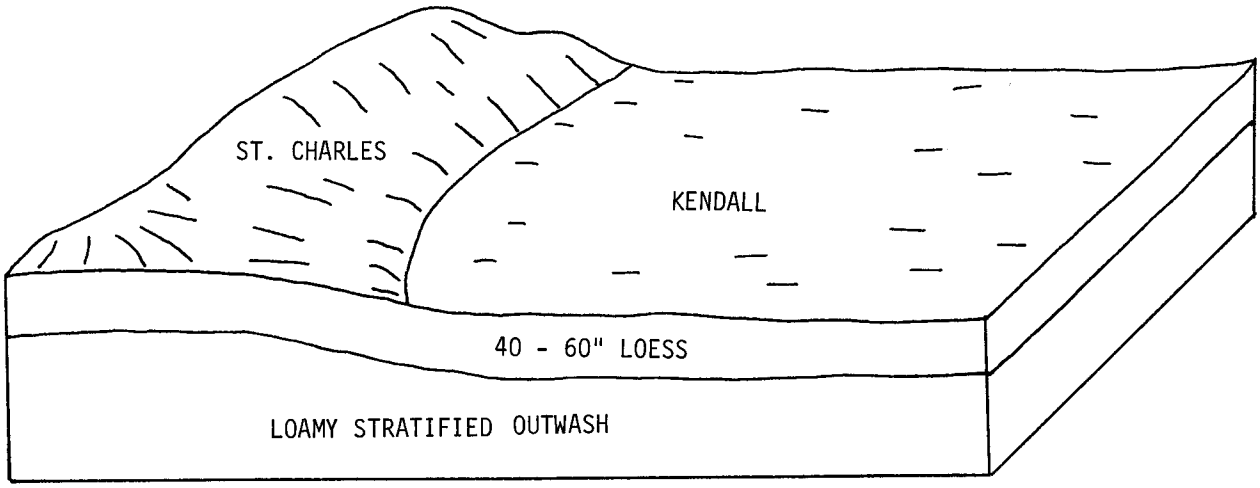
Parent material and landscape position of major soils in Soil Association 8. (Fig. 11)

Area 9 Kendall-St. Charles Association

Soil association 9 is of minor extent and occurs in upland glacial outwash positions adjacent to the Saline Branch Drainage Ditch in the northeastern part of the survey area.

The major soils in the area (Kendall and St. Charles) are developed in 40 to 60 inches of loess over loamy stratified outwash on mostly nearly level to very gently sloping topography. These are light-colored soils developed under forest native vegetation.

This soil association occupies less than 1 percent of the survey area. It is about 30 percent Kendall soils, 25 percent St. Charles soils, and 45 percent other soils such as Virgil, Batavia and a little dark-colored Drummer in some of the low-lying areas. The Kendall soils are somewhat poorly drained and occur almost entirely on nearly level topography. The St. Charles soils are well- to moderately well-drained and occur on very gently sloping topography. For more information on individual soils see the section, "Descriptions of Champaign-Urbana Area Soils", in this report.



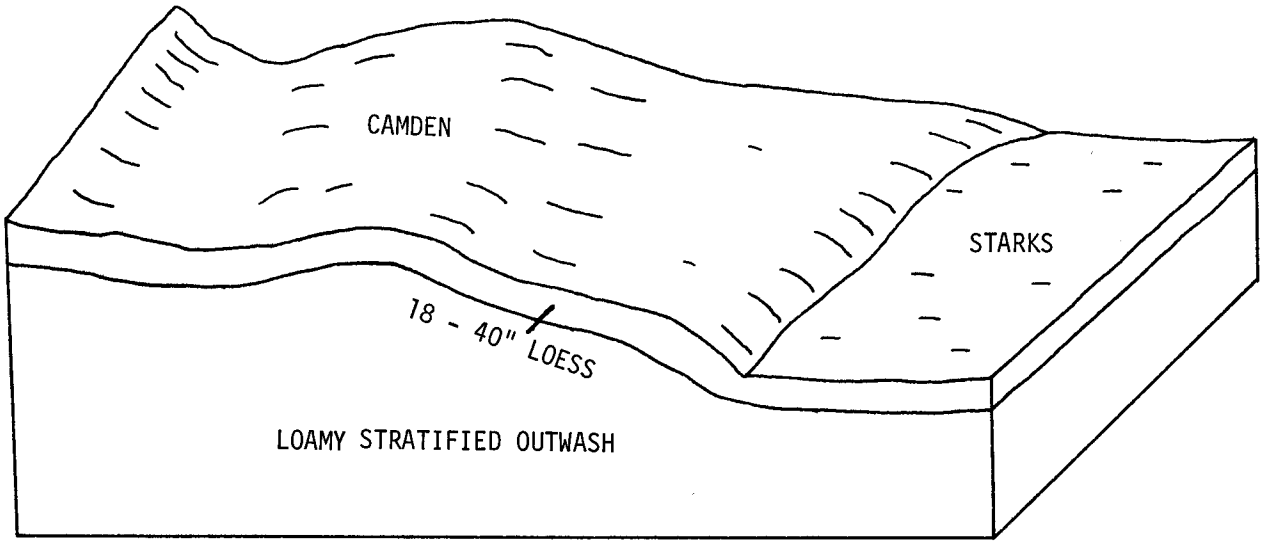
Parent material and landscape position of major soils in Soil Association 9. (Fig. 12)

Area 10 Camden-Starks Association

Soil association 10 is of minor extent and occurs in upland outwash plains and along stream terraces along the Saline Branch Drainage Ditch in the northeast part of the survey area.

The major soils in the association (Camden and Starks) are developed in 24 to 36 inches of silty material over loamy stratified outwash on very gently to gently sloping topography. They are light-colored soils developed under forest native vegetation.

This soil association occupies less than 1 percent of the survey area. It is about 85 percent Camden soils, 5 percent Starks soils, and 10 percent other soils such as Kendall and St. Charles. The well to moderately well-drained Camden soils occur over a wide range in slope from nearly level to moderately sloping. The somewhat poorly drained Starks is of small extent and occurs on nearly level topography. For more information on individual soils see the section, "Descriptions of Champaign-Urbana Area Soils", in this report.



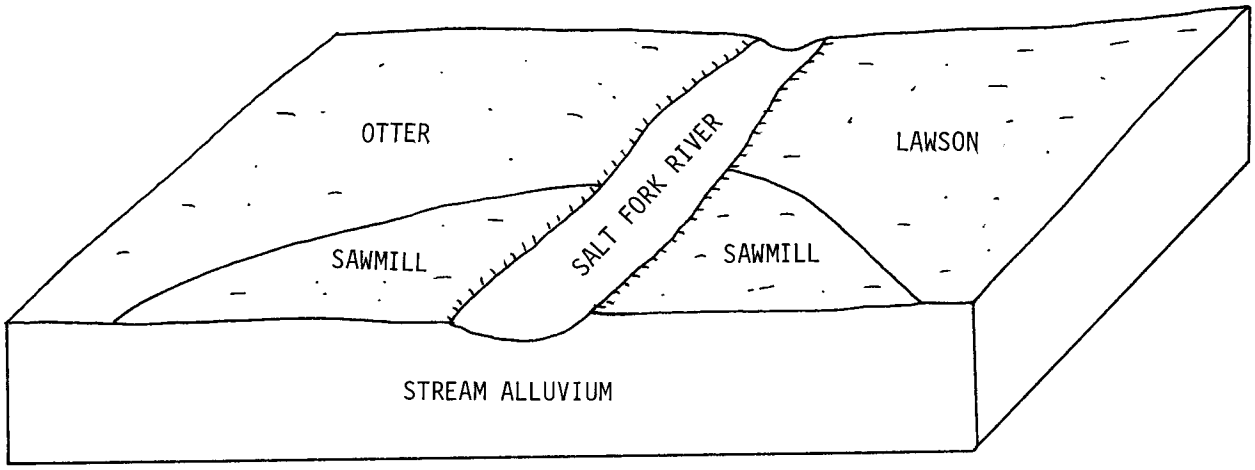
Parent material and landscape position of major soils in Soil Association 10. (Fig. 13)

Area 11 Otter-Lawson-Sawmill Association

Soil association 11 occurs in the bottomlands along the natural course of the Saline Branch Drainage Ditch in the northeast part of the survey area.

The major soils in the association (Otter, Lawson, and Sawmill) are developed in alluvial sediments more than 60 inches thick ranging in texture from silt loam to silty clay loam on level bottomland topography. All these soils are dark colored.

This soil association occupies a little less than 2 percent of the survey area. It is about 30 percent Otter soils, 30 percent Lawson soils, 30 percent Sawmill soils, and 10 percent other soils such as Camden. The poorly drained Otter soils and the somewhat poorly drained Lawson soils are developed from silty alluvial sediments. The poorly drained Sawmill soils are developed in silty clay loam alluvial sediments. For more information on individual soils see the section, "Descriptions of Champaign-Urbana Area Soils", in this report.



Parent material and landscape position of major soils in Soil Association 11. (Fig. 14)

DESCRIPTIONS OF CHAMPAIGN-URBANA AREA SOILS

The general occurrence, formation, relationship to other soils, and soil profile characteristics of each soil are given in this section. The profile characteristics are for an extensive mapping unit which has not been severely eroded.

Mapping units for each soil series are listed and briefly described, giving the series name, texture of the surface horizon, range in slope gradient, and degree of erosion if it is moderate or severe. If erosion is not indicated in the mapping unit name, the soil has little or no erosion.

Names of the mapping units are given under each soil series in the following sections and listed in Table 1, Index to soil mapping units, estimated acreages, and soil interpretations.

In the soil profile descriptions, the horizons are designated by letters. The soil description includes the depth, color, texture, structure, consistence, reaction, and nature of horizon boundary for the several horizons in each profile.

Munsell color notations and consistence are for moist soils. The color notations refer to soil color standards developed by the Munsell Color Co., Inc. The notations consist of three variables: hue, value, and chroma. In the notation 10YR 4/2, for example, the hue is denoted by the 10YR (YR = yellow red); the value by 4; and the chroma by 2. Hue is the dominant spectral (rainbow) color and is related to the dominant wave length of the light. Value refers to the relative lightness or darkness and is a function of the total amount of light. Chroma is the relative purity or strength of the spectral color.

Following the soil profile description, such items as mapping inclusions, permeability, surface runoff, available water capacity, and organic matter content (Alexander, 1970) are indicated.

The soils are described in alphabetical order on the following pages, but are in numerical order by soil type number in Table 1.

Atlanta Series (385)*

Atlanta soils are moderately dark colored, moderately well to well drained, and developed in 40 to 60 inches of loess over loam glacial till under mixed prairie-forest native vegetation. They occur on very gently sloping areas in loess-covered upland glacial till plains mainly in soil area 6 on the general soil map. They occur on the landscape with the light-colored Birkbeck and somewhat poorly drained Sunbury soils.

One mapping unit is shown on the soil map:

385B Atlanta silt loam, 2-4% slopes

About 7 percent of the Atlanta soils are in urban development, with the remainder mostly in cropland with some pasture and forest. Permeability is moderate. Surface runoff is moderate. Available water capacity is high. Surface organic matter content averages 2.5 to 3.0 percent.

Soil description of Atlanta silt loam:

A_1 (0-6") Very dark brown (10YR 2/2 moist) silt loam; moderate fine crumb structure; friable; medium acid; clear smooth boundary.

A_2 (6-12") Dark grayish brown (10YR 4/2 moist) to very dark grayish brown (10YR 3/2 moist) silt loam; fine to medium granular structure, with some patchy gray (10YR 5/1) silt coatings; friable; strongly acid; clear smooth boundary.

B_{1t} (12-17") Brown (10YR 4/3 moist) light silty clay loam; moderate fine subangular blocky structure, with patchy gray (10YR 5/1) silt coatings; firm; strongly acid; clear smooth boundary.

B_{21t} (17-26") Brown (10YR 4/3) silty clay loam; moderate to strong medium subangular blocky structure, with continuous very dark gray (10YR 3/1) clay films and patchy gray (10YR 5/1) silt coatings in upper part; firm; strongly acid; clear smooth boundary.

B_{22t} (26-39") Dark grayish brown (10YR 4/2 moist) silty clay loam, with many fine brown (10YR 4/3) and dark yellowish brown (10YR 4/4) mottles; moderate to strong medium subangular blocky structure, with continuous very dark grayish brown (10YR 3/2) clay films; firm; very strongly acid; clear smooth boundary.

B_{31t} (39-45") Brown (10YR 4/3 moist) light silty clay loam, with common medium distinct dark grayish brown (10YR 4/2) and yellowish brown (10YR 5/6) mottles; weak coarse subangular and angular blocky structure, with patchy very dark gray (10YR 3/1) clay films; firm; strongly acid; clear smooth boundary.

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* Atlanta is a tentative series not officially correlated as of the date of this survey.

B_{31t} (39-45") Brown (10YR 4/3 moist) light silty clay loam, with common medium distinct dark grayish brown (10YR 4/2) and yellowish brown (10YR 5/6) mottles; weak coarse subangular and angular blocky structure, with patchy very dark gray (10YR 3/1) clay films; firm; strongly acid; clear smooth boundary.

IIB_{32} (45-54") Brown (10YR 5/3 moist) light clay loam, with many medium distinct yellowish brown (10YR 5/6), gray (10YR 5/1), and brown (10YR 4/3) mottles; weak coarse angular blocky structure, with thin patchy very dark gray (10YR 3/1) clay films; firm; slightly acid; abrupt smooth boundary.

IIC (54-65") Light olive brown (2.5Y 5/4 moist) loam till; massive; firm; calcareous; moderately alkaline.

Batavia Series (105)

Batavia soils are moderately dark colored, moderately well to well drained, and developed in 40 to 60 inches of loess over loamy stratified outwash under mixed prairie-forest native vegetation. They occur on very gently sloping terraces and low uplands adjacent to streams in soil area 9 on the general soil map. On the landscape they are associated with the moderately dark colored, somewhat poorly drained Virgil soils, the dark colored, moderately well- to well-drained Plano soils, and the very dark colored, poorly drained Drummer soils.

One mapping unit is shown on the soil map:

105B Batavia silt loam, 2-4% slopes

Nearly all the Batavia soils in the Champaign-Urbana area are in urban areas. Permeability is moderate and available water capacity is high. Surface runoff is medium. Surface organic matter content averages 2.5 percent.

Soil description of Batavia silt loam:

A_1 (0-7") Very dark brown (10YR 2/2 moist) silt loam; moderate fine granular structure; friable; neutral; clear smooth boundary.

A_2 (7-15") Dark grayish brown (10YR 4/2 moist) silt loam; weak fine platy structure breaking to moderate medium granular; friable; medium acid; clear smooth boundary.

B_1 (15-20") Dark brown (10YR 3/3-4/3 moist) light silty clay loam; moderate fine to medium subangular blocky structure; firm; medium acid; clear smooth boundary.

B_{21t} (20-27") Brown (10YR 4/3 moist) silty clay loam; moderate medium subangular blocky structure, with patchy dark brown (10YR 3/3) clay films; firm; strongly acid; clear smooth boundary.

B_{22t} (27-37") Yellowish brown (10YR 5/4 moist) silty clay loam; moderate medium to coarse subangular blocky structure, with discontinuous dark brown (10YR 3/3) clay films; firm; medium acid; clear smooth boundary.

B_{31t} (37-44") Yellowish brown (10YR 5/4 moist) light silty clay loam, with few fine faint grayish brown (10YR 5/2 moist) mottles; weak coarse subangular blocky structure, with patchy brown (10YR 4/3) clay films; firm; slightly acid; abrupt smooth boundary.

IIB_{32} (44-54") Brown (10YR 5/3 moist) light clay loam, with common medium distinct grayish brown (2.5Y 5/2) mottles; weak coarse angular blocky; firm; neutral; clear wavy boundary.

IIB_{33t} (54-60") Brown (10YR 4/3 moist) light loam; very weak coarse angular blocky structure; friable; mildly alkaline; clear wavy boundary.

IIC (60-70") Yellowish brown (10YR 5/5 moist) loam to light clay loam, with common medium faint brown (10YR 5/3) mottles; massive; friable; calcareous; stratified.

Birkbeck Series (233)

Birkbeck soils are light colored, moderately well to well drained, and developed in 40 to 60 inches of loess over loam glacial till under forest native vegetation. They occur on nearly level to gently sloping upland till plains in soil area 6 on the general soil map. They are associated on the landscape with the somewhat poorly drained Sabina, the poorly drained Ward, and the thinner loess Russell soils.

Five mapping units are shown on the soil map:

233A	Birkbeck silt loam, 0-2% slopes
233B	Birkbeck silt loam, 2-4% slopes
233B2	Birkbeck silt loam, 2-4% slopes, eroded
233C	Birkbeck silt loam, 4-7% slopes
233C2	Birkbeck silt loam, 4-7% slopes, eroded

Some 233A areas will have a few inches thicker and a darker surface than modal for the series. About 11 percent of the Birkbeck soils on the survey area are in the urban area with the remainder in cropland, pasture or forest. Permeability is moderate and surface runoff is slow to moderate. Available water capacity is high. Surface organic matter content averages 2.0 where cultivated.

Soil description of Birkbeck silt loam:

A_1 (0-5") Very dark grayish brown (10YR 3/2 moist) silt loam; moderate fine granular structure; friable; neutral to slightly acid; abrupt smooth boundary.

A_2 (5-12") Dark grayish brown (10YR 4/2 moist) silt loam; weak medium platy structure breaking to moderate fine granular; friable; strongly acid.

B_{1t} (12-18") Brown (10YR 4/3 moist) light silty clay loam; moderate fine subangular blocky structure; firm; very strongly acid; clear smooth boundary.

B_{21t} (18-27") Dark yellowish brown (10YR 4/4 moist) silty clay loam; moderate fine to medium subangular blocky structure, with continuous brown (10YR 4/3) clay films; firm, very strongly acid; clear smooth boundary.

B_{22t} (27-35") Dark yellowish brown (10YR 4/4 moist) silty clay loam; moderate medium to coarse angular and angular blocky structure, with dark brown (10YR 4/3) clay films; firm, very strongly acid; clear smooth boundary.

B_{23t} (35-42") Dark yellowish brown (10YR 4/4 moist) silty clay loam, with few fine faint grayish brown (10YR 5/2) and yellowish brown (10YR 5/4 and 5/6) mottles; moderate medium subangular blocky structure, with discontinuous brown (10YR 4/3) clay films; firm; medium acid; clear smooth boundary.

IIB_{3t} (42-60") Mixed yellowish brown (10YR 5/4 and 5/6 moist) and dark yellowish brown (10YR 4/4 moist) light clay loam; weak medium subangular blocky structure, with thin discontinuous brown (10YR 4/3) clay films; firm; slightly acid; clear smooth boundary.

IIC (60-65") Yellowish brown (10YR 5/4 moist) loam till; massive; friable; calcareous.

Brenton Series (149)

Brenton soils are dark colored, somewhat poorly drained, and developed in less than 40 inches of loess or silty material over stratified loamy outwash material under prairie native vegetation. They occur on nearly level to very gently sloping areas of glacial outwash plains and stream terraces principally in soil area 5 on the general soil map. They are associated on the landscape with the moderately well to well drained Proctor and the very dark colored, poorly drained Drummer soils.

Two mapping units are shown on the soil map:

149A	Brenton silt loam, 0-2% slopes
149B	Brenton silt loam, 2-4% slopes

Brenton soils are mostly in cropland with 11 percent in urban areas. Runoff is slow to medium and permeability moderate. Available water capacity is high. Surface organic matter content averages 4.5 percent.

Soil description of Brenton silt loam:

A_p (0-7") Black (10YR 2/1) silt loam; moderate fine granular structure; friable; neutral; abrupt smooth boundary.

A_{12} (7-10") Black (10YR 2/1) silt loam; moderate medium granular structure; friable; slightly acid; clear smooth boundary.

A_3 (10-14") Very dark grayish brown (10YR 3/2) silt loam with few fine faint dark grayish brown (10YR 4/2) mottles; moderate medium to coarse granular structure; friable; medium acid; clear smooth boundary; an occasional pebble.

B_{21t} (14-18") Dark grayish brown and dark brown (10YR 4/2 and 4/3) light silty clay loam; moderate very fine to fine subangular blocky structure with very dark grayish brown (10YR 3/2) thin discontinuous clay coatings; friable; medium acid; clear smooth boundary; an occasional pebble.

B_{22t} (18-24") Dark grayish brown (10YR 4/2) silty clay loam with few fine distinct dark yellowish brown and yellowish brown (10YR 4/4 and 5/6) mottles; weak fine prismatic to moderate fine and medium subangular blocky structure with very dark grayish brown (10YR 3/2) thin nearly continuous clay coatings; firm; slightly acid; clear smooth boundary; few fine Fe-Mn concretions and an occasional pebble.

B_{23t} (24-34") Dark grayish brown to grayish brown (2.5Y 4/2 to 5/2) silty clay loam with few fine faint light brownish gray (2.5Y 6/2) and common fine to medium distinct yellowish brown (10YR 5/6 and 5/8) mottles; moderate fine prismatic to moderate medium subangular blocky structure with dark gray (10YR 4/1) thin nearly continuous clay coatings; firm; slightly acid; clear smooth boundary; common fine Fe-Mn concretions and an occasional pebble.

IIB_{31} (34-43") Grayish brown (2.5Y 5/2) light clay loam with many medium to coarse prominent strong brown (7.5YR 5/6 and 5/8) mottles; weak to moderate medium subangular and angular blocky structure with occasional dark gray (10YR 4/1) thin clay coatings; friable; neutral; abrupt smooth boundary; common fine Fe-Mn concretions.

IIB_{32} (43-47") Grayish brown and light brownish gray (2.5Y 5/2 and 6/2) heavy loam with many medium to coarse prominent strong brown (7.5YR 5/6 and 5/8) mottles; weak coarse angular blocky structure; friable; weakly calcareous with slight effervescence; clear smooth boundary; common fine Fe-Mn concretions.

IIC (47-65") Yellowish brown (10YR 5/6 and 5/4) loam to sandy loam with occasional strata of silt loam and with few medium prominent pinkish gray (7.5YR 6/2) and common coarse prominent light gray and light brownish gray (10YR 6/1 and 6/2) mottles; friable; calcareous with moderate effervescence; common fine Fe-Mn concretions.

Brooklyn Series (136)

Brooklyn soils are dark colored, poorly drained, and developed in loess on silty material 40 to 60 inches thick over loamy stratified outwash and loam till under prairie native vegetation. They occur on nearly level to depressional areas in nearly all parts of the area with the larger areas occurring on the outwash plain in front of the Champaign moraine. Their main area of occurrence is in soil area 4 on the general

soil map. Brooklyn soils are associated on the landscape with a wide variety of soils such as Plano, Elburn, Proctor, Brenton, Flanagan, Catlin, and Drummer.

One mapping unit is shown on the soil map:

136A Brooklyn silt loam, 0-2% slopes

Some areas of Brooklyn soils are somewhat poorly drained. About 4 percent of this mapping unit is in urban areas with the major part in cultivated crops. Permeability is slow and surface runoff is slow to ponded. Available water capacity is high. Surface organic matter content averages 3.5 percent.

Soil description of Brooklyn silt loam:

A_p (0-8") Very dark brown (10YR 2/2 moist) silt loam; moderate fine granular structure; friable; slightly acid; abrupt smooth boundary.

A_2 (8-16") Light brownish gray (10YR 6/2 moist) to grayish brown (10YR 5/2 moist) silt loam, with few fine distinct yellowish brown (10YR 5/8 and 5/6) mottles; weak fine platy structure breaking to moderate medium granular; friable; strongly acid; many Fe-Mn concretions; abrupt smooth boundary.

B_{21tg} (16-22") Gray (5Y 5/1 moist) silty clay loam, with many medium distinct yellowish brown (10YR 5/6 and 5/8) mottles; moderate fine subangular blocky structure, with continuous dark grayish brown (10YR 4/2) clay films; firm; strongly acid; many fine to medium Fe-Mn concretions; clear smooth boundary.

B_{22tg} (22-35") Grayish brown (2.5Y 5/2 moist) heavy silty clay loam, with many medium distinct yellowish brown (10YR 5/6 and 5/8) mottles; weak fine prismatic structure breaking to moderate fine subangular blocky, with continuous gray (10YR 5/1) clay films; firm; strongly acid; many fine Fe-Mn concretions; clear smooth boundary.

B_{23tg} (35-43") Mixed grayish brown (2.5Y 5/2 moist) and yellowish brown (10YR 5/6 and 5/8 moist) silty clay loam; moderate medium to coarse subangular blocky structure, with continuous gray (10YR 5/1) clay films; firm; strongly acid; abrupt smooth boundary.

IIB_{31} (43-50") Mixed gray (10YR 5/1 moist) and yellowish brown (10YR 5/6 and 5/8 moist) clay loam; weak medium subangular blocky structure; firm; medium acid; clear smooth boundary.

IIB_{32} (50-55") Brown (7.5YR 5/4 moist) clay loam to sandy clay loam, with many fine faint dark brown (7.5YR 4/2 and 4/4) mottles; weak medium to coarse subangular blocky structure; friable; slightly acid; clear smooth boundary.

IIC (55-60") Mixed dark grayish brown (10YR 4/2 moist), brown (7.5YR 4/4 moist), light brown (7.5YR 6/4 moist), and reddish yellow (7.5YR 6/6 moist) clay loam to sandy clay loam; massive; friable; neutral.

Camden Series (134)

Camden soils are light colored, well to moderately well drained, and developed in 24 to 36 inches of loess or silty material over stratified loamy outwash under forest native vegetation. They occur on stream terraces and glacial outwash plains principally in soil area 10 on the general soil map. They are associated on the landscape with the somewhat poorly drained Starks soils and the St. Charles soils which have 40 to 60 inches of loess over stratified loamy outwash.

Four mapping units are shown on the soil map:

134A	Camden silt loam, 0-2% slopes
134B	Camden silt loam, 2-4% slopes
134C	Camden silt loam, 4-7% slopes
134D2	Camden silt loam, 7-12% slopes, eroded

Nearly 65 percent of the Camden soils in the Champaign-Urbana area are in urban areas. In many areas, especially along stream terraces, Camden soils may be underlain by sand and gravel deposits at depths greater than 60 inches. A few acres of 134B will be moderately eroded and a few acres of 134D2 will not be moderately eroded. A second A_2 horizon indicated in the profile description may not always be present. Permeability is moderate, runoff is slow to rapid depending on slope, and available water capacity is high. Surface organic matter content averages 2.0 percent.

Soil description of Camden silt loam:

A_1 (0-3") Very dark gray (10YR 3/1) silt loam; very weak, fine, crumb structure; friable, slightly acid, abrupt smooth boundary.

A_{21} (3-6") Dark grayish brown (10YR 4/2) silt loam; weak, fine, platy structure; worm casts prominent; friable; slightly acid; clear smooth boundary.

A_{22} (6-12") Brown (10YR 4/3) silt loam; moderate, medium, platy structure; worm casts prominent; friable; slightly acid; clear smooth boundary.

B_1 (12-18") Brown (10YR 5/3) heavy silt loam; moderate, fine, subangular blocky structure, with discontinuous, light gray (10YR 7/2) silt coatings on ped faces; friable; medium acid; clear smooth boundary.

B_{21t} (18-24") Yellowish brown (10YR 5/4) silty clay loam; moderate to strong, medium, subangular blocky structure, with discontinuous, light gray (10YR 7/2) silt coatings and discontinuous, brown (10YR 5/3) clay skins on ped faces; firm; strongly acid; clear smooth boundary.

B_{22t} (24-31") Yellowish brown (10YR 5/4) heavy silty clay loam; moderate to strong, medium, subangular blocky structure, with discontinuous, brown (10YR 5/3) clay skins on ped faces; gradual; firm; strongly acid; smooth boundary.

IIB_{23t} (31-42") Yellowish brown (10YR 5/4) gritty silty clay loam; moderate, medium to coarse, angular and subangular blocky structure, with discontinuous, brown (7.5YR 5/4) clay skins on ped faces; few, black (10YR 2/1) iron-manganese concretions; firm; strongly acid; clear, smooth boundary.

IIB_{31} (42-63") Yellowish brown (10YR 5/4) gritty heavy silt loam with common, fine, distinct, yellowish brown (10YR 5/8) mottles; slightly firm; moderate, coarse, angular blocky structure, with patchy, brown (7.5YR 4/3) clay skins on ped faces; few, black (10YR 2/1) iron-manganese concretions; friable; medium to slightly acid; abrupt smooth boundary.

IIC_1 (63-75") Brown (7.5YR 5/4) massive, friable, loamy sand.

Catlin Series (171)

Catlin soils are dark colored, moderately well to well drained, and developed in 40 to 60 inches of loess on loam glacial till under prairie native vegetation. They occur on very gently sloping to gently sloping upland till plains and moraines in soil area 1 and 2 on the general soil map. They are associated on the landscape with the dark colored, somewhat poorly drained Flanagan and the very dark colored, poorly drained Drummer soils.

Two mapping units are shown on the soil map:

171B	Catlin silt loam, 2-4% slopes
171C	Catlin silt loam, 4-7% slopes

Nearly one-third of Catlin soils are found in the urban areas, with the rest being in cropland. Permeability is moderate, runoff is medium, and available water capacity is high to very high. Surface organic matter content averages 3.5 percent.

Soil description of Catlin silt loam:

A_p (0-6") Very dark grayish brown (10YR 3/2 moist) to very dark gray (10YR 3/1 moist) silt loam; weak fine granular structure; friable; slightly acid; abrupt smooth boundary.

A_{12} (6-9") Very dark grayish brown (10YR 3/2 moist) silt loam; moderate fine granular structure; friable; medium acid; clear smooth boundary.

A_3 (9-13") Very dark grayish brown (10YR 3/2 moist) heavy silt loam; moderate medium granular structure; friable; medium acid; clear smooth boundary.

B_1 (13-18") Brown (10YR 4/3 moist) light silty clay loam; moderate fine subangular blocky structure, with continuous very dark grayish brown (10YR 3/2) clay films; firm; medium acid; clear smooth boundary.

B_{21t} (18-28") Dark yellowish brown (10YR 4/4 moist) silty clay loam; weak medium prismatic structure breaking to moderate fine to medium subangular and angular blocky structure with continuous brown (10YR 4/3) clay films; firm; slightly acid; clear smooth boundary.

B_{22t} (28-35") Yellowish brown (10YR 5/4 moist) silty clay loam, with common fine distinct light brownish gray (10YR 6/2) and common fine faint yellowish brown (10YR 5/6 and 5/8) mottles; weak medium prismatic structure breaking to moderate fine to medium subangular and angular blocky, with discontinuous brown (10YR 4/3) clay films; firm; slightly acid; few Fe-Mn concretions; clear smooth boundary.

B_{31} (35-41") Mixed yellowish brown (10YR 5/4, 5/6, and 5/8 moist), pale brown (10YR 6/3 moist), light brownish gray (10YR 6/2 moist), and grayish brown (10YR 5/2 moist) light silty clay loam; weak medium subangular and angular blocky structure, with discontinuous brown (10YR 4/3) clay films; firm; slightly acid; abrupt smooth boundary.

IIB_{32} (41-52") Mixed yellowish brown (10YR 5/4, 5/6, and 5/8 moist), light brownish gray (10YR 6/2 moist), and grayish brown (10YR 5/2 moist) gritty silty clay loam; weak medium to coarse angular blocky structure; firm; neutral; abrupt smooth boundary.

IIC (52-60") Light olive brown (2.5Y 5/4 moist) loam till; massive; firm; moderately alkaline; calcareous; till pebbles and stones present.

Dana Series (56)

Dana soils are dark colored, moderately well drained, and developed in 18 to 40 inches of loess over loam till leached to greater than 40 inches. They occur on very gently sloping to gently sloping areas mainly in soil area 3 on the general soil map. They are associated on the landscape with the dark colored, somewhat poorly drained Raub soils and the very dark colored, poorly drained Drummer soils.

Four mapping units are shown on the detailed soil map:

56B	Dana silt loam, 2-4% slopes
56B2	Dana silt loam, 2-4% slopes, eroded
56C	Dana silt loam, 4-7% slopes
56C2	Dana silt loam, 4-7% slopes, eroded

Some areas of Dana soils, mainly on C slopes, are well drained, with the water table fluctuating at lower depths in the soil. A very few areas of 56C2 will have 40 to 50 inches of loess. Dana is a fairly extensive soil in the survey area with about 8 percent occurring in urban areas, and the major portion being in cropland. Permeability is moderate and surface runoff is medium to rapid. Available water capacity is high. Surface organic matter content averages 3.5 percent.

Soil description of Dana silt loam:

A_p (0-7") Very dark brown (10YR 3/2 moist) to very dark grayish brown (10YR 3/2 moist) silt loam; weak to moderate fine granular structure; friable; slightly acid; abrupt smooth boundary.

A_{12} (7-13") Very dark grayish brown (10YR 3/2 moist) heavy silt loam; moderate medium granular structure; friable; medium acid; clear smooth boundary.

B_{21t} (13-18") Brown (10YR 4/3 moist) silty clay loam; moderate fine to medium subangular blocky structure with thin discontinuous very dark grayish brown (10YR 3/2) clay films on ped faces; firm; medium acid; clear smooth boundary.

B_{22t} (18-24") Brown (10YR 4/3 moist) silty clay loam with few fine distinct yellowish brown (10YR 5/4 and 5/6) mottles; moderate medium subangular blocky structure, with dark grayish brown (10YR 4/2) clay films on ped faces; firm; medium acid; clear smooth boundary.

IIB_{24t} (24-37") Dark yellowish brown (10YR 4/4 moist) clay loam with many fine to medium distinct brown (10YR 3/2 moist) to dark grayish brown (10YR 4/2 moist) and yellowish brown (10YR 5/6 moist) mottles; moderate medium to coarse subangular blocky structure with dark grayish brown (10YR 4/2 moist) clay films on ped faces; firm; slightly acid; clear smooth boundary.

IIB_3 (37-50") Brown (10YR 4/3 moist) heavy loam, with common fine distinct grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; firm to friable; slightly acid to neutral; clear smooth boundary.

IIC (50-60"+) Light olive brown (2.5Y 5/4 moist) loam till, with few fine distinct olive yellow (2.5Y 6/6) and olive brown (2.5Y 5/6) mottles; massive; friable; few pebbles; calcareous.

Dodge Series (24)

Dodge soils are light colored, well drained, and developed in 18 to 36 inches of loess or silty material over loam glacial till under forest native vegetation. Depth to carbonates occurs above 40 inches, usually around 35 inches. They occur on very gently sloping to gently sloping upland till plains in soil area 7 on the general soil map. They are associated on the landscape with the light colored, well drained Miami, Birkbeck, and Hennepin soils.

Three mapping units are shown on the detailed soil map:

24B	Dodge silt loam, 2-4% slopes
24C	Dodge silt loam, 4-7% slopes
24C2	Dodge silt loam, 4-7% slopes, eroded

A small acreage of 24B is moderately well drained. A very small acreage will have A_1 or A_p horizons darker and a little thicker than is normal for the series. Nearly 40 percent of the Dodge soils occur in urban areas and the remainder is cultivated or in pasture or woodland. Permea-

bility is moderate and surface runoff is medium to rapid. Available water capacity is high. Surface organic matter content averages 2.0 percent.

Soil description of Dodge silt loam:

A_1 (0-4") Dark grayish brown (10YR 4/2 moist) (10YR 5/2 dry) silt loam; moderate fine granular structure; friable; neutral; abrupt smooth boundary.

A_2 (4-11") Yellowish brown (10YR 5/4 moist) silt loam; moderate thin platy structure; friable to very friable; slightly acid; clear smooth boundary.

B_1 (11-16") Brown (10YR 4/3 moist) heavy silt loam; moderate fine subangular blocky structure; friable; slightly acid; clear smooth boundary.

B_{21t} (16-25") Dark yellowish brown (10YR 4/4 moist) silty clay loam; moderate fine to medium subangular blocky structure; thin patchy clay film on some ped faces and a few slight gray (10YR 7/2 dry) silt coatings; firm; strongly acid; clear smooth boundary.

IIB_{22t} (25-35") Brown (10YR 4/3 moist) gritty heavy silty clay loam; moderate medium subangular and angular blocky structure; continuous clay film; firm; medium to slightly acid; clear wavy boundary.

IIC (35-55") Yellowish brown (10YR 5/4 moist) loam till, with some material of gravel and stone size; massive, firm; calcareous, mild to moderately alkaline.

Drummer Series (152)

Drummer soils are very dark colored, poorly drained, and developed in 40 to 60 inches of loess or silty material over stratified loamy to sandy outwash or loam till under marsh grass prairie native vegetation. They occur on nearly level to depressional areas in nearly all parts of the survey area, but especially in areas 1, 2, 3, 4, and 5 on the general soil map. Drummer soils are associated on the landscape with the Flanagan, Catlin, Elburn, Plano, Brenton and Proctor soils.

One mapping unit is shown on the soil map:

152A Drummer silty clay loam, 0-2% slopes

Drummer is the most extensive soil in the survey area, occupying nearly 40 percent of the entire 2 1/2 township area around Champaign-Urbana. Nearly 13 percent of the Drummer soils are in urban areas with the major portion being in cropland. Very minor acreages have a thin silty overwash over the normal soil, these usually occurring along drainageways currently having ditches. Permeability is moderate. Surface runoff is slow to ponded. Available water capacity is very high. Surface organic matter content averages 6.0 percent.

Soil description of Drummer silty clay loam:

A_{11} (0-7") Black (10YR 2/1) light silty clay loam; weak fine granular structure; firm; many roots; medium acid; gradual smooth boundary.

A_{12} (7-14") Black (10YR 2/1) light clay loam; moderate fine subangular blocky structure breaking to weak fine granular structure; firm; many roots; slightly acid; clear smooth boundary.

B_1 (14-19") Very dark gray (10YR 3/1) silty clay loam, few fine faint very dark grayish brown (2.5Y 3/2) mottles; moderate fine and medium subangular blocky structure; firm; many roots; slightly acid; gradual smooth boundary.

B_{21g} (19-25") Dark gray (10YR 4/1) silty clay loam, common fine distinct yellowish brown (10YR 5/4 and 5/6) mottles; moderate fine prismatic structure breaking to moderate fine blocky structure; firm; many roots; many worm holes; neutral; gradual smooth boundary.

B_{22g} (25-32") Grayish brown (2.5Y 5/2) silty clay loam, many medium prominent yellowish brown (10YR 5/4) mottles; weak, fine and medium prismatic structure breaking to moderate fine blocky structure; firm; many roots; thin discontinuous dark gray (N 4) coatings; neutral; gradual wavy boundary.

B_{23g} (32-41") Yellowish brown (10YR 5/4 and 5/6) light silty clay loam, many medium prominent gray (N 5) mottles; weak medium prismatic structure breaking to weak medium blocky structure; firm; few roots; thin discontinuous dark gray (N 4) coatings; neutral; clear wavy boundary.

IIB_{3g} (41-47") Yellowish brown (10YR 5/6 or 5/8) silt loam, common medium prominent gray (N 5) mottles; weak coarse blocky structure; friable; few roots; thin discontinuous dark gray (10YR 4/1) coatings; neutral; abrupt wavy boundary.

IIC_g (47-60") Dark gray (10YR 4/1) stratified loam and sandy loam, many medium prominent olive brown (2.5Y 4/4) and gray (N 5) mottles; structureless, massive and single grain; mildly alkaline.

Elburn Series (198)

Elburn soils are dark colored, somewhat poorly drained, and developed in 40 to 60 inches of loess over loamy stratified outwash under prairie native vegetation. They occur on nearly level to very gently sloping loess covered outwash plains and stream terraces in soil area 4 on the general soil map. They are associated on the landscape with the dark colored, moderately well to well drained Plano and the very dark colored, poorly drained Drummer soils.

Two mapping units are shown on the soil map:

198A	Elburn silt loam, 0-2% slopes
198B	Elburn silt loam, 2-4% slopes

Only about 10% of the Elburn soils in the survey area are in urban development, the major part being in cropland. Some acreage of 198A and 198B along the headwater of the Kaskaskia River have loess thicknesses slightly over 60 inches. Permeability is moderate and surface runoff is slow to medium. The available water capacity is high. Surface organic matter content averages 4.5 percent.

Soil description of Elburn silt loam:

A_p (0-8") Black (10YR 2/1 moist) silt loam; moderate fine to medium granular structure; friable; slightly acid; abrupt smooth boundary.

A_{12} (8-14") Black (10YR 2/1 moist) silt loam; strong fine to medium granular structure; friable; medium acid; clear smooth boundary.

B_1 (14-17") Dark grayish brown (10YR 4/2 moist) light silty clay loam with few fine distinct yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure with continuous very dark gray (10YR 3/1) clay films; firm; slightly acid; clear smooth boundary.

B_{21t} (17-28") Dark grayish brown (10YR 4/2 moist) silty clay loam, with many medium distinct yellowish brown (10YR 5/4, 5/6, and 5/8) mottles and common fine, faint, gray (10YR 5/1) mottles; moderate fine to medium prismatic structure breaking to fine to medium subangular and angular blocky, with discontinuous dark gray (10YR 4/1) clay films; firm; slightly acid; many fine Fe-Mn concretions; clear smooth boundary.

B_{22t} (28-37") Mixed yellowish brown (10YR 5/4 and 5/8 moist) silty clay loam; moderate medium prismatic structure breaking to moderate medium subangular and angular blocky, with patchy dark gray (10YR 4/1) and dark grayish brown (10YR 4/2) clay films; firm; slightly acid to neutral; many fine Fe-Mn concretions; clear smooth boundary.

B_{31} (37-43") Mixed gray (10YR 5/1 moist) and yellowish brown (10YR 5/4, 5/6, and 5/8 moist) light silty clay loam; weak medium subangular and angular blocky structure, with patchy dark gray (10YR 4/1) and dark grayish brown (10YR 4/2) clay films; friable; neutral; abrupt smooth boundary.

IIB_{32} (43-54") Mixed gray (10YR 5/1 moist) and yellowish brown (10YR 5/4, 5/6, and 5/8 moist) clay loam; weak medium to coarse subangular and angular blocky structure; friable; slightly alkaline; abrupt smooth boundary.

IIC (54-60") Dark grayish brown (10YR 4/2 moist) sandy loam stratified with loamy sand and silt loam, with common fine to medium faint dark gray (10YR 4/1) and common fine distinct yellowish brown (10YR 5/6 and 5/8) mottles; single grain to massive; very friable; mildly alkaline.

Fincastle Series (496)

Fincastle soils are light colored, somewhat poorly drained, and developed in 18 to 40 inches of loess on loam glacial till under forest native vegetation. They occur on very gently sloping areas on upland till plains in

soil area 7 on the general soil map. They are associated on the landscape with the well drained Russell and the moderately well drained Xenia soils.

One mapping unit is shown on the soil map:

496B Fincastle silt loam, 2-4% slopes

Within the survey area the acreage of Fincastle soils is very small. They are mostly in cropland with a small portion within the urban area. Permeability is moderately slow. Surface runoff is slow to medium. Available water capacity is high.

Soil description of Fincastle silt loam:

A_p (0-7") Dark grayish brown (10YR 4/2 moist) silt loam; moderate fine granular structure; friable; slightly acid; abrupt smooth boundary.

A_2 (7-12") Grayish brown (10YR 5/2 moist) silt loam; weak medium platy structure breaking to moderate fine granular; friable; medium acid; clear smooth boundary.

B_1 (12-16") Brown (10YR 5/3 moist) light silty clay loam, with few fine distinct yellowish brown (10YR 5/6 and 5/8) mottles; moderate very fine subangular blocky structure; firm; medium acid; clear smooth boundary.

B_{21t} (16-30") Brown (10YR 5/3 moist) silty clay loam, with common fine distinct grayish brown (2.5Y 5/2) and common fine faint (10YR 5/4 and 5/6) mottles; moderate fine to medium subangular structure, with continuous dark grayish brown (10YR 4/2) clay films; firm; strongly acid; clear smooth boundary.

IIB_{22t} (30-40") Grayish brown (10YR 5/2 moist) clay loam, with many medium distinct yellowish brown (10YR 5/4 and 5/6) mottles; moderate medium subangular blocky structure, with continuous dark grayish brown (10YR 4/2) clay films; firm; common Fe-Mn concretions; strongly acid; clear smooth boundary.

IIB_3 (40-45") Grayish brown (2.5Y 5/2 moist) light silty clay loam, with many fine distinct yellowish brown (10YR 5/4 and 5/6) mottles; weak coarse subangular blocky structure; many fine Fe-Mn concretions; firm; neutral; clear smooth boundary.

IIC (45-60") Mixed yellowish brown (10YR 5/4 and 5/6 moist) and grayish brown (2.5Y 5/2 moist) loam till; massive; friable; few small till pebbles; calcareous.

Flanagan Series (154)

Flanagan soils are dark colored, somewhat poorly drained, and developed in 40 to 60 inches of loess over loam till under prairie native vegetation. They occur on nearly level to very gently sloping upland loess covered glacial till plains in soil areas 1 and 2 on the general soil

map. Flanagan soils are associated on the landscape with the moderately well- to well-drained Catlin and the very dark colored, poorly drained Drummer soils.

Two mapping units are shown on the soil map:

154A	Flanagan silt loam, 0-2% slopes
154B	Flanagan silt loam, 2-7% slopes

Slightly over 23 percent of the Flanagan soils in the survey area are in urban development with the major portion being in cropland. Permeability is moderate and surface runoff is slow to medium. Available water capacity is high to very high. Surface organic matter content averages 4.5 percent.

Soil description of Flanagan silt loam:

A_1 (0-8") Very dark gray (10YR 3/1) silt loam; moderate medium crumb structure; friable; medium acid; gradual smooth boundary.

A_{12} (8-15") Very dark brown (10YR 2/2) heavy silt loam; moderate medium crumb structure; friable; medium acid; clear smooth boundary.

A_3 (15-18") Very dark grayish brown (10YR 3/2) heavy silt loam; moderate medium crumb structure; friable; medium acid; clear smooth boundary.

B_{21t} (18-23") Dark grayish brown (10YR 4/2) heavy silty clay loam, few fine faint dark brown (10YR 4/3) and very dark grayish brown (10YR 3/2) mottles; moderate fine subangular blocky structure; continuous very dark grayish brown (10YR 3/2) coatings on peds; firm; medium acid; clear smooth boundary.

B_{22t} (23-32") Dark grayish brown (10YR 4/2) heavy silty clay loam, common fine faint brown (10YR 5/3) and dark brown (10YR 4/3) mottles; moderate medium subangular blocky structure; continuous very dark grayish brown (10YR 3/2) coatings on peds; firm; medium acid; clear smooth boundary.

B_{23t} (32-38") Yellowish brown (10YR 5/4) silty clay loam, common fine distinct light yellowish brown (10YR 6/4) and yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; continuous very dark grayish brown (10YR 3/2) coatings on peds; firm; slightly acid; clear smooth boundary.

B_{31} (38-45") Mottled yellowish brown (10YR 5/6) light brownish gray, brown (10YR 6/2) and brown (10YR 5/3) heavy silt loam; weak medium subangular blocky structure; discontinuous thin very dark grayish brown (10YR 3/2) coatings on peds; friable; slightly acid to neutral; gradual smooth boundary.

IIB_{32} (45-49") Mixed yellowish brown (10YR 5/4), light olive brown (2.5Y 5/4), and light brownish gray (10YR 6/2) gritty silt loam; weak coarse subangular blocky structure; friable; patchy thin dark grayish brown (10YR 3/2) clay films; few pebbles; neutral; abrupt smooth boundary.

IIC (49-58") Yellowish brown (10YR 5/4) loam till, common fine or medium distinct light brownish gray (10YR 6/2) mottles; structureless, massive; friable; calcareous.

Harpster Series (67)

Harpster soils are very dark colored, poorly drained, calcareous throughout, and developed in loess over loam till or loess over loamy outwash under swamp grass native vegetation. They occur on nearly level to depressional areas primarily in soil areas 1 and 4 on the general soil map. They normally occur within associations with the very dark colored, poorly drained Drummer soils.

One mapping unit is shown on the soil map:

67A Harpster silty clay loam, 0-2% slopes

Most areas of Harpster soils have snail shells scattered throughout the A horizon and sometimes deeper into the B horizon. Most areas shown on the soil map will be in cropland. A few areas too small or too difficult to detect will be found in low lying areas within the urban area. Permeability is moderate to moderately slow and surface runoff is slow to ponded. Available water capacity is high to very high. Surface organic matter content averages 5.5 percent.

Soil description of Harpster silty clay loam:

A_{pca} (0-9") Black (10YR 2/1 moist) silty clay loam; weak to moderate medium granular structure; friable; calcareous; strongly effervescent; moderately alkaline; very occasional pebble; common snail shells; abrupt smooth boundary.

A_{3ca} (9-13") Very dark gray (10YR 3/1 moist) silty clay loam; moderate medium granular structure; firm; calcareous; strongly effervescent; moderately alkaline; very occasional pebble; common snail shells; clear smooth boundary.

B_{1g} (13-16") Dark grayish brown (2.5Y 4/2 moist) silty clay loam; moderate very fine to fine subangular blocky structure with very dark gray (10YR 3/1) discontinuous clay-organic films; firm; calcareous, moderate to weak effervescence; moderately alkaline; occasional carbonate concretions; very occasional pebble; common snail shells; clear smooth boundary.

B_{21g} (16-19") Grayish brown (2.5Y 5/2 moist) to light olive brown (2.5Y 5/4 moist) silty clay loam, with few fine faint yellowish brown (10YR 5/6 and 5/8) mottles; moderate medium subangular blocky structure with continuous clay films; firm, calcareous; weak effervescence; mildly alkaline; occasional carbonate concretions; very occasional pebble; common snail shells; gradual smooth boundary.

B_{22g} (19-26") Light brownish gray (2.5Y 6/2 moist) silty clay loam with many fine to medium distinct light yellowish brown (2.5Y 6/4 moist) to olive yellow (2.5Y 6/6 moist) mottles; moderate to weak

medium subangular blocky structure, with continuous clay films; friable; calcareous; weak effervescence; mildly alkaline; occasional carbonate concretions; gradual smooth boundary.

B_{3g} (26-37") Light brownish gray (2.5Y 6/2 moist) heavy silt loam, with common fine distinct olive yellow (2.5Y 6/6 and 6/8) mottles; weak fine to medium subangular and angular blocky structure, with discontinuous clay films; friable; calcareous; mildly alkaline; weak effervescence; occasional carbonate concretions; gradual smooth boundary.

C_{1ca} (37-46") Light olive gray (5Y 6/2 moist) silt loam, with common fine to medium prominent brownish yellow (10YR 6/6 and 6/8) mottles; structureless; massive; friable; calcareous; strong effervescence; mildly to moderately alkaline; occasional carbonate concretions; abrupt smooth boundary.

IIC_{2ca} (46-60") Light olive gray (5Y 6/2 moist) stratified loamy sand, sandy loam, and silt loam, with many fine to coarse prominent yellowish brown (10YR 5/6 and 5/8) mottles; massive to single grain; friable to loose; strongly calcareous; many carbonate concretions.

Hennepin Series (25)

Hennepin soils are light colored, well drained, and developed in loam till under forest native vegetation. They occur on moderately steep slopes primarily in soil area 8 on the general soil map. The Hennepin soils are associated on the landscape mostly with the light colored, well drained St. Charles, Dodge and Miami soils.

Two mapping units are shown on the detailed soil map:

25F	Hennepin loam, 18-40% slopes
25F2	Hennepin loam, 18-40% slopes, eroded

Because of their steep position on the landscape, Hennepin soils tend to have more variation in profile characteristics within any one delineation than is normal for most other soils in the area. A few small areas will be leached to depths of 22 to 28 inches and a few other small areas will be severely eroded. Sometimes a thin 1 to 2 inch thick A_2 horizon may be present at depths of 3 to 6 inches. Hennepin soils are mostly in timber and pasture with about 15 percent in urban areas. They are rarely used for cropland. Permeability is moderate and surface runoff is very rapid. Available water capacity is high. Surface organic matter content averages 2.0 percent.

Soil description of Hennepin silt loam:

A_1 (0-5") Dark grayish brown (10YR 4/2 moist) loam, weak to moderate fine granular structure; friable; slightly acid; clear smooth boundary.

B (5-15") Brown (10YR 4/3 moist) loam; moderate coarse granular to fine subangular blocky structure; neutral; clear smooth boundary.

C (15-40"+) Yellowish brown (10YR 5/4 moist) loam till; massive to weak coarse angular blocky structure; calcareous; mildly to moderately alkaline.

Houghton Series (103)

Houghton soils are very dark colored, noncalcareous, very poorly drained organic soils developed in herbaceous organic deposits more than 50 inches thick under primarily swampy native vegetation. They occur in depressional areas. Only one area is shown on the soil map near the center of Section 25 in T20N, R9E. These soils are not common in Champaign County. The one delineation occurs adjacent to Drummer and Peotone soils in a low lying area.

One mapping unit is shown on the soil map:

103A Houghton muck; 0-2% slopes

Near the outer edges of the one delineation of Houghton, mineral material is encountered at depths less than 50 inches. It is mostly under cultivation at the present time. Permeability is rapid and surface runoff is very slow to ponded. Available water capacity is very high.

Soil description of Houghton muck:

O_{a1p} (0-10") Black (10YR 1/1 moist) muck; massive; very friable; neutral; clear smooth boundary.

Oa2 (10-40") Black (10YR 1/1 moist) muck; massive; very friable; neutral; gradual smooth boundary.

O_{a3} (40-60") Black (10YR 2/1 moist) muck; massive; very friable; slightly acid to neutral

Kendall Series (242)

Kendall soils are light colored, somewhat poorly drained, and developed in 40 to 60 inches of loess over loamy stratified outwash under forest native vegetation. They occur on nearly level to very gently sloping areas on loess covered glacial outwash plains and stream terraces in soil area 9 on the general soil map. They are associated on the landscape with the better drained St. Charles soils and where the loess is thinner with the Camden and Starks soils.

Two mapping units are shown on the soil map:

242A Kendall silt loam, 0-2% slopes
242B Kendall silt loam, 2-4% slopes

About 30 percent of the Kendall soils on A slopes in the survey area are in urban development, with the major part being in cropland and some in pasture or forest. Permeability is moderate. Surface runoff is slow to medium. Available water capacity is high. Surface organic matter content averages 2.0 percent.

Soil description of Kendall silt loam:

A_p (0-8") Dark grayish brown (10YR 4/2 moist) silt loam; moderate to weak medium granular structure; friable; neutral; abrupt smooth boundary.

A_2 (8-11") Grayish brown (10YR 5/2 moist) silt loam; weak fine platy structure breaking to moderate fine granular structure; friable; slightly acid to neutral; clear smooth boundary.

B_1 (11-15") Brown (10YR 5/3 moist) light silty clay loam; moderate fine subangular blocky structure; firm; slightly acid; clear smooth boundary.

B_{21t} (15-25") Grayish brown (10YR 5/2 moist) silty clay loam, with common fine distinct yellowish brown (10YR 5/4 and 5/6) mottles; moderate fine to medium subangular blocky structure, with continuous dark grayish brown (10YR 4/2) clay films and a few patchy light gray (10YR 7/1) silt coatings; firm; strongly acid; clear smooth boundary.

B_{22t} (25-35") Grayish brown (10YR 5/2 moist) silty clay loam, with common medium distinct yellowish brown (10YR 5/4 and 5/6) and light brownish gray (10YR 6/2) mottles; moderate medium to coarse subangular blocky structure, with continuous dark gray (10YR 4/1) to dark grayish brown (10YR 4/2) clay films; firm; strongly acid; clear smooth boundary.

B_{31t} (35-45") Mixed yellowish brown (10YR 5/4 and 5/6 moist), grayish brown (10YR 5/2 moist), and light brownish gray (10YR 6/2 moist) light silty clay loam; weak coarse angular blocky structure, with thin discontinuous gray (10YR 5/1) clay films; firm; slightly acid; clear smooth boundary.

IIB_{32} (45-52") Mixed gray (10YR 5/1 moist), light olive brown (2.5Y 5/4 moist), and yellowish brown (10YR 5/4, 5/6 and 5/8 moist) loam to sandy loam with occasional fine gravel; weak medium to coarse subangular blocky structure; friable; neutral; clear smooth boundary.

IIC (52-60") Mixed grayish brown (2.5Y 5/2 moist) and yellowish brown (10YR 5/4 moist) stratified loam, sandy loam, and silt loam with some fine gravel; massive; friable; mildly alkaline.

LaRose Series (60)

The LaRose soils are dark colored, well drained, and developed in less than 10 inches of loess on loam glacial till and prairie native vegetation. They occur on gently sloping to moderately sloping upland areas primarily in soil area 2 on the general soil map. They are associated on the landscape with the well drained Saybrook soils, the moderately well drained Dana soils, and the moderately well to well drained Catlin soils.

Two mapping units are shown on the detailed soil map:

60C	LaRose silt loam, 4-7% slopes
60D2	LaRose silt loam, 7-12% slopes, eroded

The LaRose soils are of limited extent within the Champaign-Urbana area. Some small severely eroded spots will occur within the 60D2 mapping unit. The depth to calcareous loam till ranges from 8 to 24 inches, depending primarily on erosion. The total A horizon may be as thin as 6 to 7 inches in some areas. LaRose soils are almost entirely in cropland. Permeability is moderate and surface runoff is rapid. Available water capacity is high. Surface organic matter averages 3.0 percent in uneroded areas.

Soil description of LaRose silt loam:

A_p (0-7") Very dark grayish brown (10YR 3/2 moist) silt loam; weak to moderate fine granular structure; friable; abrupt smooth boundary.

A_{12} (7-10") Very dark grayish brown (10YR 3/2 moist) gritty silt loam; moderate fine to medium granular structure; friable; slightly acid; clear smooth boundary.

B_{21t} (10-15") Brown (10YR 4/3 moist) gritty silty clay loam; moderate fine subangular blocky structure, with thin continuous clay films; many till pebbles; firm; slightly acid; clear smooth boundary.

B_{22t} (15-20") Dark yellowish brown (10YR 4/4 moist) clay loam; moderate medium subangular blocky structure, with thin continuous clay film; many till pebbles; firm; neutral; clear smooth boundary.

C (20-60") Yellowish brown (10YR 5/4 moist) to light olive brown (2.5Y 5/4 moist) loam till; structureless; massive; friable; many till pebbles.

Lawson Series (451)

Lawson soils are dark colored, non-calcareous, somewhat poorly drained and developed in silty alluvial sediments on stream floodplains. They occur primarily on nearly level areas in the floodplains on soil area 11 on the general soil map. They are associated on the floodplain landscape with other bottomland soils such as the poorly drained Otter and Sawmill soils.

One mapping unit is shown on the soil map:

451A Lawson silt loam, 0-2% slopes

A small portion of the Lawson soils in the survey area will be moderately well to well drained. Some larger areas will be in cropland, while small narrow areas will have other uses. Permeability is moderate and surface runoff is slow. Available water capacity is high to very high. Surface organic matter content averages 4.0 percent.

Soil description of Lawson silt loam:

A_1 (0-20") Black (10YR 2/1 moist) to very dark brown (10YR 2/2 moist) silt loam; moderate medium granular structure; friable; neutral; gradual smooth boundary.

A_{12} (20-30") Very dark gray (10YR 3/1 moist) silt loam; moderate to weak fine subangular blocky structure; friable; neutral; clear smooth boundary.

C (30-50") Dark grayish brown (10YR 4/2 moist) gritty silt loam to loam, with common fine distinct yellowish brown (10YR 5/6 and 5/8) mottles; massive to weak, medium to coarse subangular blocky structure; friable; neutral; stratified with thin lenses of sandy loam and sand; occasionally a thin layer of fine pebbles will occur.

Miami Series (27)

Miami soils are light colored, well drained, and developed in less than 18 inches of loess on loam glacial till under forest native vegetation. They occur on very gently sloping to strongly sloping areas in soil area 7 on the general soil map. They are associated on the landscape with the light colored, well drained Birkbeck, Hennepin and Miami soils.

Six mapping units are shown on the detailed soil map:

27B	Miami silt loam, 2-4% slopes
27C	Miami silt loam, 4-7% slopes
27C2	Miami silt loam, 4-7% slopes, eroded
27D	Miami silt loam, 7-12% slopes
27D2	Miami silt loam, 7-12% slopes, eroded
27E2	Miami silt loam, 12-18% slopes, eroded

A few areas on C, D, and E slopes will be shallower to carbonates than is normal for the series. Nearly half of the Miami soils occur in the urban area, with the remainder in cropland, pasture or forest. Permeability is moderate, and surface runoff is medium on gentle slopes and rapid on steeper slopes. Available water capacity is high. Surface organic matter content averages 2.0 percent.

Soil description of Miami silt loam:

A_p (0-6") Grayish brown (10YR 4/2 moist) silt loam; moderate medium granular structure; friable; slightly acid; abrupt smooth boundary.

A_2 (6-12") Yellowish brown (10YR 5/4 moist) silt loam; weak fine to medium platy structure; friable; slight to medium acid; clear smooth boundary.

IIB_{21t} (12-17") Brown (10YR 4/3 moist) silty clay loam with noticeable grit; moderate medium subangular blocky structure, with clay films of dark brown (10YR 3/3 moist) to dark yellowish brown (10YR 4/4 moist) and a few pale brown (10YR 6/3) silt coatings; firm; medium acid; clear smooth boundary.

IIB_{22t} (17-30") Dark brown (10YR 4/3 moist) clay loam; moderate medium subangular blocky structure with dark brown (10YR 3/3 moist) clay films; firm; medium acid; clear smooth boundary.

IIB_3 (30-35") Brown (10YR 5/3 moist) light clay loam; weak medium to coarse subangular blocky structure with thin patchy dark yellowish brown (10YR 4/3 moist) clay films; friable to firm; weakly calcareous; mildly alkaline; clear smooth boundary.

II_C (35-60"+) Brown (10YR 5/3 moist) loam till; structureless; massive; friable; few pebbles; strongly calcareous.

Otter Series (76)

Otter soils are dark colored, poorly drained, bottomland soils developed in silty alluvial sediments more than 60 inches thick. They occur on level to nearly level areas along the floodplain of the Saline Branch Drainage Ditch in soil area 11 on the general soil map. Otter soils are associated on the floodplain landscape with other bottomland soils such as Sawmill and Lawson.

One mapping unit is shown on the soil map:

76A Otter silt loam, 0-2% slopes

A significant portion of these soils occur within the urban area while the remainder is in cropland. These soils are subject to flooding during periods of high rainfall. Some areas are underlain by loamy material with some pebbles at depths as shallow as 30 inches. Permeability is moderate. Surface runoff is slow to ponded. Available water capacity is very high. Surface organic matter content averages 5.5 percent.

Soil description of Otter silt loam:

A_p (0-8") Black (10YR 2/1 moist) silt loam; moderate fine granular structure; friable; neutral; abrupt smooth boundary.

A_{12} (8-24") Black (10YR 2/1 moist) silt loam; moderate medium granular structure; friable; neutral; diffuse smooth boundary.

A_{13} (24-30") Very dark gray (10YR 3/1 moist) silt loam; weak medium granular structure; friable; gradual smooth boundary.

C_g (30-50") Grayish brown (2.5Y 5/2 moist) silt loam with thin strata of sand and silty clay loam; few fine yellowish brown (10YR 5/6 and 5/8) mottles; massive; friable; neutral to mildly alkaline.

Parr Series (221)

Parr soils are dark colored, well drained, and developed in less than 10 inches of loess over loamy glacial till under prairie native vegetation. They occur on very gently sloping to moderately sloping upland areas in soil area 3 on the general soil map. They are associated on the landscape with the Dana, Catlin, and Saybrook soils.

Five mapping units are shown on the soil map:

221B	Parr silt loam, 2-4% slopes
221C	Parr silt loam, 4-7% slopes
221C2	Parr silt loam, 4-7% slopes, eroded
221C3	Parr soils, 4-7% slopes, severely eroded
221D2	Parr silt loam, 7-12% slopes, eroded

The 221D2 soil mapping unit will contain some areas where the loess is 18 to 40 inches thick over the loam till. Parr soils are more deeply leached than the LaRose soils. Permeability is moderate and surface runoff is medium to rapid. Available water capacity is high. Surface organic matter content averages 3.0 percent.

Soil description of Parr silt loam:

A_p (0-7") Very dark grayish brown (10YR 3/2 moist) silt loam; weak fine to medium granular structure; friable; medium acid; abrupt smooth boundary.

B_{1t} (7-10") Dark brown (10YR 4/3 moist) gritty light silty clay loam, weak fine subangular blocky structure, with continuous very dark grayish brown (10YR 3/2) clay films; firm; slightly acid; clear smooth boundary.

B_{21t} (10-17") Yellowish brown (10YR 5/4 moist) gritty silty clay loam; moderate medium prismatic structure breaking to moderate to strong fine to medium angular and subangular blocky, with continuous very dark grayish brown (10YR 4/2) clay films; firm; slightly acid; gradual smooth boundary.

B_{22t} (17-24") Light olive brown (2.5Y 5/4 moist) gritty silty clay loam; moderate medium prismatic structure breaking to strong medium subangular and angular blocky, with continuous very dark grayish brown (10YR 4/2) clay films; firm; neutral; gradual smooth boundary.

B_{23t} (24-32") Light olive brown (2.5Y 5/4 moist) gritty silty clay loam; weak to moderate medium prismatic structure breaking to moderate fine to medium subangular blocky, with discontinuous dark grayish brown (10YR 4/2) and grayish brown (10YR 5/2) clay films; firm; neutral; clear smooth boundary.

B_{3t} (32-39") Light olive brown (2.5Y 5/4 moist) gritty light silty clay loam; weak fine to medium prismatic structure breaking to moderate fine to medium subangular blocky, with patchy grayish brown (10YR 5/2) clay films; firm; calcareous, weakly effervescent; gradual smooth boundary.

C (39-50") Mixed light olive brown (2.5Y 5/4 moist) and grayish brown (10YR 5/2 moist) loam till; weak coarse angular blocky structure to massive; firm; calcareous; compact.

Peotone Series (330)

Peotone soils are very dark colored, very poorly drained, and developed in depressions that receive sediments of loess and glacial drift from surrounding areas. They are developed under prairie and marsh grass native vegetation and occur primarily in depressional areas in soil areas 1, 2, 3, 4, and 5 on the general soil map. They are associated on the landscape with all the major dark colored soils found in the survey area.

One mapping unit is shown on the soil map:

330A Peotone silty clay loam, 0-2% slopes

Most of the areas of Peotone soils are in cropland. Many areas of Peotone soils are small (2-3 acres) in size. Many areas indicated by a wet spot symbol will be Peotone soils. Permeability is moderately slow. Surface runoff is slow to ponded. Available water capacity is very high to high. Surface organic matter content averages 6.0 percent.

Soil description of Peotone silty clay loam:

A_p (0-7") Black (10YR 2/1 moist) silty clay loam; weak fine to medium subangular blocky structure; firm; medium acid; a few pebbles; abrupt smooth boundary.

A_{12} (7-15") Black (10YR 2/1 moist) silty clay loam; moderate fine subangular blocky structure; firm; slightly acid; a few pebbles; clear smooth boundary.

B_{21g} (15-24") Very dark gray (10YR 3/1 moist) gritty silty clay loam; weak medium prismatic structure breaking to moderate medium angular and subangular blocky, with discontinuous black (10YR 2/1) clay films; firm; neutral; a few pebbles; clear smooth boundary.

B_{22g} (24-31") Dark grayish brown (2.5Y 4/2 moist) gritty silty clay loam, with common fine prominent yellowish brown (10YR 5/6 and 5/8) mottles; weak to moderate medium prismatic structure breaking to weak medium angular blocky, with discontinuous very dark gray (10YR 3/1) and black (10YR 2/1) clay films; neutral to mildly alkaline; clear smooth boundary.

B_{3g} (31-38") Gray (5Y 5/1 moist) silty clay loam, with common fine prominent yellowish brown (10YR 5/6 and 5/8) mottles; weak medium to coarse angular blocky structure; firm; mildly alkaline; abrupt smooth boundary.

C_g (38-50") Gray (5Y 5/1 moist) clay loam; massive; friable; calcareous.

Plano Series (199)

Plano soils are dark colored, moderately well to well drained, and developed in 30 to 50 inches of loess over loamy stratified glacial outwash under prairie native vegetation. They occur on nearly level to very gently sloping upland glacial outwash plains and stream terraces in area 4 on the general soil map. They are associated on the landscape with the dark colored, somewhat poorly drained Elburn and the very dark colored, poorly drained Drummer soils.

Two mapping units are shown on the soil map:

199A	Plano silt loam, 0-2% slopes
199B	Plano silt loam, 2-4% slopes

About 9 percent of the total acreage of this soil in this survey area is in the urban area, the rest is mainly in cropland. Permeability is moderate and surface runoff is slow to medium. Available water capacity is high to very high. Surface organic matter content averages 4.0 percent.

Soil description of Plano silt loam:

A_1 (0-12") Very dark brown (10YR 2/2 moist) silt loam; moderate fine granular structure; friable; slightly acid; clear smooth boundary.

A_3 (12-21") Very dark grayish brown (10YR 3/2 moist) silt loam, moderate medium granular structure; friable; medium acid; clear smooth boundary.

B_{1t} (21-26") Dark brown (10YR 3/3 moist) light silty clay loam; moderate very fine subangular blocky structure, with very dark grayish brown (10YR 3/2) continuous clay-organic films; firm; strongly acid; clear smooth boundary.

B_{21t} (26-36") Brown (10YR 4/3 moist) silty clay loam; moderate fine subangular blocky structure, with continuous dark grayish brown (10YR 4/2) clay films; firm; strongly acid; clear smooth boundary.

B_{22t} (36-48") Dark yellowish brown (10YR 4/4 moist) silty clay loam; moderate fine to medium subangular blocky structure, with continuous brown (10YR 4/3) clay films; firm; strongly acid; abrupt smooth boundary.

IIB_{31} (48-55") Yellowish brown (10YR 5/4 moist) loam; weak medium subangular blocky structure; firm to friable; medium acid; clear smooth boundary.

IIB_{32} (55-66") Dark brown (10YR 3/3 moist) sandy loam stratified with loam and silt loam; weak medium subangular blocky structure; friable; medium to slightly acid.

Proctor Series (148)

Proctor soils are dark colored, moderately well to well drained, and developed in less than 40 inches of loess or silty material over stratified loamy outwash under prairie native vegetation. They occur on nearly level to gently sloping areas, primarily in soil area 5 on the general soil map. They are associated on the landscape with the dark-colored, somewhat poorly drained Brenton soils, the Plano soils which have 40 to 60 inches of loess over stratified loamy outwash, and the very dark colored, poorly drained Drummer soils.

Four mapping units are shown on the soil map:

148A	Proctor silt loam, 0-2% slopes
148B	Proctor silt loam, 2-4% slopes
148C	Proctor silt loam, 4-7% slopes
148C2	Proctor silt loam, 4-7% slopes, eroded

Nearly 23 percent of the Proctor soils are found in the urban area in this survey, with the remainder being in cropland. A very few acres of 148C will have loess 40 to 60 inches thick and another very few acres will have a moderately dark surface horizon. A small part of the 148C2 mapping unit will have slopes of 7 to 12 percent. Permeability is moderate and surface runoff is slow to medium. Available water capacity is high. Surface organic matter content averages 3.5 percent.

Soil description of Proctor silt loam:

A_p (0-8") Very dark brown (10YR 2/2) silt loam; moderate medium granular structure; friable; slightly acid; abrupt smooth boundary.

A_3 (8-14") Very dark grayish brown (10YR 3/2) and very dark brown (10YR 2/2) silt loam; moderate medium granular structure; friable; slightly acid; clear smooth boundary.

B_{21t} (14-19") Brown or dark brown (10YR 4/3) silty clay loam; moderate medium and fine subangular blocky structure; firm; continuous dark brown (10YR 3/3) clay films; medium acid; clear smooth boundary.

B_{22t} (19-27") Brown or dark brown (10YR 4/3) silty clay loam; moderate medium and fine subangular blocky structure; discontinuous dark brown (10YR 3/3) clay films; medium acid; clear smooth boundary.

B_{23t} (27-36) Brown or dark brown (10YR 4/3) silty clay loam; few fine faint grayish brown (10YR 5/2) and common fine and medium faint yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; firm; discontinuous dark brown (10YR 3/3) clay films; few iron-manganese concretions; slightly acid; abrupt smooth boundary.

IIB_{31t} (36-44") Brown or dark brown (10YR 4/3) clay loam; many medium faint grayish brown and brown (10YR 5/2 and 5/3) and common fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; firm; discontinuous dark brown (10YR 3/3) clay films; numerous iron-manganese concretions; slightly acid; abrupt smooth boundary.

IIB_{32} (44-50") Light olive brown (2.5Y 5/4) and olive brown (2.5Y 4/4) stratified loam and sandy loam; few fine faint grayish brown (2.5Y 5/2) mottles; weak medium angular and subangular blocky structure; friable; discontinuous brown (10YR 4/3) clay films; many iron-manganese concretions; slightly acid; clear smooth boundary.

IIC_1 (50-66") Dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/4) stratified loam and sandy loam; massive; friable; slightly acid; abrupt smooth boundary.

IIC_2 (66-80") Brown (10YR 5/3) and yellowish brown (10YR 5/4) stratified layers of loamy sand, sand, and sandy loam; mostly single grain but some bands are massive; loose in sand layers and friable in sandy loam layers. Slightly acid.

Raub Series (481)

Raub soils are dark colored, somewhat poorly drained, and developed under prairie native vegetation in 18 to 40 inches of loess over loam glacial till calcareous at depths below 40 inches. They occur on nearly level to very gently sloping areas in loess covered upland till plains and moraines in soil area 3 on the general soil map. They are associated on the landscape with the moderately well drained Dana and poorly drained Drummer soils.

Two mapping units are shown on the soil map:

481A	Raub silt loam, 0-2% slopes
481B	Raub silt loam, 2-4% slopes

Raub soils constitute a very minor acreage in the survey area and are mostly in cropland. Permeability is moderate. Surface runoff is slow to medium. Available water capacity is high. Surface organic matter content averages 4.0 percent.

Soil description of Raub silt loam:

A_p (0-7") Black (10YR 2/1 moist) silt loam; moderate fine to medium granular structure; friable; neutral; abrupt smooth boundary.

A_{12} (7-14") Black (10YR 2/1 moist) silt loam; moderate medium granular structure; friable; slightly acid; clear smooth boundary.

B_{1t} (14-19") Dark grayish brown (10YR 4/2 moist) light silty clay loam, with few fine distinct yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; with continuous very dark grayish brown (10YR 3/2) clay films; friable; medium acid; clear smooth boundary.

B_{21t} (19-30") Brown (10YR 5/3 moist) and grayish brown (10YR 5/2 moist) silty clay loam, with many fine to medium distinct yellowish brown (10YR 5/6 and 5/8) mottles; moderate medium subangular blocky structure, with continuous very dark grayish brown (10YR 3/2) clay films; firm; medium acid; clear smooth boundary.

IIB_{22t} (30-38") Yellowish brown (10YR 5/4 moist) clay loam, with common medium distinct to faint grayish brown (2.5Y 5/2) and yellowish brown (10YR 5/6 and 5/8) mottles; moderate medium subangular blocky structure, with very dark grayish brown (10YR 3/2) clay films; firm; slightly acid; clear smooth boundary.

IIB_3 (38-45") Yellowish brown (10YR 5/4 moist) light clay loam, with many medium distinct gray (10YR 5/1) and grayish brown (10YR 5/2) mottles; weak coarse subangular blocky structure; friable; few pebbles; thin discontinuous dark grayish brown (10YR 4/2) clay films; neutral; clear smooth boundary.

IIC (45-60") Mixed grayish brown (10YR 5/2 moist) and light olive brown (2.5Y 5/4 moist) loam till; massive; friable; few pebbles; calcareous.

Russell Series (322)

Russell soils are light colored, well drained, and developed in 18 to 40 inches of loess over loam glacial till under forest native vegetation. Depth to carbonates is greater than 40 inches, usually around 45 inches. They occur on very gently sloping to gently sloping areas in uplands in soil area 6 on the general soil map. They are associated on the landscape with the moderately well drained Xenia soils and the somewhat poorly drained Fincastle soils.

Four mapping units are shown on the soil map:

322B	Russell silt loam, 2-4% slopes
322B2	Russell silt loam, 2-4% slopes, eroded
322C	Russell silt loam, 4-7% slopes
322C2	Russell silt loam, 4-7% slopes, eroded

Some 322C delineation will be moderately well drained and some will have moderately dark surfaces. Some of the area of Russell soils is in cropland, with the rest in pasture or forest. Permeability is moderate. Surface runoff is slow to medium. Available water capacity is high. Surface organic matter content averages 2.0 percent in cultivated surfaces.

Soil description of Russell silt loam:

A_p (0-7") Dark grayish brown (10YR 4/2 moist) silt loam; moderate fine to medium granular structure; friable; neutral; abrupt smooth boundary.

A_2 (7-11") Brown (10YR 4/3 moist) (10YR 5/4 dry) silt loam; weak medium platy structure breaking to moderate fine granular structure; friable; slightly acid; clear smooth boundary.

B_1 (11-15") Yellowish brown (10YR 5/6 moist) light silty clay loam; moderate fine subangular blocky structure, with continuous brown (10YR 4/3) clay films and patchy pale brown (10YR 6/3) silt coatings; friable; medium acid; clear smooth boundary.

B_{21t} (15-19") Yellowish brown (10YR 5/4 moist) silty clay loam; moderate to strong fine to medium subangular blocky structure, with continuous brown (10YR 4/3) clay films and patchy pale brown (10YR 6/3) silt coatings; firm; strongly acid; clear smooth boundary.

B_{22t} (19-27") Dark yellowish brown (10YR 4/4 moist) silty clay loam; moderate to strong medium prismatic structure breaking to strong medium angular and subangular blocky, with continuous dark grayish brown (10YR 4/2) and brown (10YR 4/3) clay films; firm; very strongly acid; clear smooth boundary.

IIB_{31t} (27-36") Yellowish brown (10YR 5/4 moist) gritty silty clay loam; weak medium to coarse angular blocky structure, with discontinuous dark grayish brown (10YR 4/2) clay films; firm; strongly acid; gradual smooth boundary.

IIB_{32} (36-45") Light olive brown (2.5Y 5/4 moist) gritty light silty clay loam; weak coarse angular blocky structure, with discontinuous dark grayish brown (10YR 4/2) clay films; neutral; abrupt smooth boundary.

IIC (45-70") Light olive brown (2.5Y 5/4 moist) loam till; massive; friable; calcareous.

Sabina Series (236)

Sabina soils are light colored, somewhat poorly drained, and developed in 40 to 60 inches of loess over loam glacial till under forest native vegetation. They occur on nearly level to very gently sloping upland loess-covered glacial till plains principally in soil area 6 on the general soil map. Sabina soils are associated on the landscape with the moderately well to well drained Birkbeck soils, the moderately dark-colored Sunbury soils, and the poorly drained Ward soils.

Two mapping units are shown on the soil map:

236A	Sabina silt loam, 0-2% slopes
236B	Sabina silt loam, 2-4% slopes

About 12% of the Sabina soils within the survey area are in urban development. The remainder is mostly in cropland with some in pasture and forest. Permeability is moderate. Surface runoff is slow to medium. Available water capacity is high. Surface organic matter content averages 2.0 percent.

Soil description of Sabina silt loam:

A_p (0-8") Dark grayish brown (10YR 4/2 moist) silt loam; moderate fine granular structure; friable; slightly acid; abrupt smooth boundary.

A_2 (8-13") Grayish brown (10YR 5/2 moist) silt loam; weak fine platy to moderate fine granular structure; few fine Fe-Mn concretions; friable; medium acid; abrupt smooth boundary.

B_1 (13-18") Brown (10YR 4/3 moist) light silty clay loam, with few fine faint yellowish brown (10YR 5/6 and 5/8) mottles; moderate fine subangular blocky structure, with patchy light gray (10YR 6/1) silt coatings; friable; medium acid; many fine Fe-Mn concretions; clear smooth boundary.

B_{21t} (18-26") Dark grayish brown (10YR 4/2 moist) heavy silty clay loam, with common fine distinct yellowish brown (10YR 5/4 and 5/6) mottles; moderate fine and medium subangular blocky structure, with continuous dark gray (10YR 4/1) clay films; firm; strongly acid; many fine Fe-Mn concretions; clear smooth boundary.

B_{22t} (26-34") Dark grayish brown (10YR 4/2 moist) heavy silty clay loam, with many fine distinct yellowish brown (10YR 5/4 and 5/6) mottles; moderate medium subangular blocky structure, with continuous very dark gray (10YR 3/1) clay films; firm; medium acid; clear smooth boundary.

B_{31t} (34-42") Mixed dark grayish brown (2.5Y 4/2 moist) and yellowish brown (10YR 5/4, 5/6, and 5/8 moist) light silty clay loam; moderate medium subangular blocky structure, with discontinuous very dark grayish brown (10YR 3/2) clay films; firm; neutral; clear smooth boundary.

IIB_{32} (42-50") Mixed yellowish brown (10YR 5/4 moist), light olive brown (2.5Y 5/4 moist), and dark grayish brown (10YR 4/2 moist) clay loam; weak medium subangular blocky structure, with patchy very dark grayish brown (10YR 3/2) clay films; firm; neutral; clear smooth boundary.

IIC (50-60") Light olive brown (2.5Y 5/4 moist) loam till; massive; friable; calcareous.

St. Charles Series (243)

St. Charles soils are light colored, well to moderately well drained, and developed in 40 to 60 inches of loess over stratified loamy outwash under forest native vegetation. They occur on nearly level to very gently sloping areas principally along loess covered stream terraces mainly in soil area 9 on the general soil map. They are associated on the landscape with the somewhat poorly drained Kendall soils and in thin loess areas with the Camden soils.

Two mapping units are shown on the soil map:

243A	St. Charles silt loam, 0-2% slopes
243B	St. Charles silt loam, 2-4% slopes

About 15 percent of the St. Charles soils are in urban development in the survey area. The remainder are in cropland, pasture or forest. Permeability is moderate and surface runoff is slow to medium. Available water capacity is high. Surface organic matter content averages 2.0 percent.

Soil description of St. Charles silt loam:

A_1 (0-5") Dark grayish brown (10YR 4/2 moist) silt loam; weak fine to medium granular structure; friable; neutral; clear smooth boundary.

A_2 (5-12") Brown (10YR 5/3 moist) silt loam; weak fine platy structure; friable; slightly acid; clear smooth boundary.

B_1 (12-16") Dark brown (10YR 4/3 moist) light silty clay loam; moderate fine subangular blocky structure; firm; medium acid; clear smooth boundary.

B_{21t} (16-23") Dark yellowish brown (10YR 4/4 moist) silty clay loam; moderate fine and medium subangular blocky structure, with thin continuous dark yellowish brown (10YR 4/4) clay films; firm; medium acid; clear smooth boundary.

B_{22t} (23-35") Yellowish brown (10YR 5/4 moist) silty clay loam, with few fine faint yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure, with continuous dark yellowish brown (10YR 4/4) clay films; firm; medium acid; clear smooth boundary.

B_{31} (35-42") Brown (10YR 5/3 moist) light silty clay loam, with few fine distinct pale brown (10YR 6/3) and yellowish brown (10YR 5/8) mottles; weak medium to coarse subangular blocky structure; firm; medium acid; clear smooth boundary.

IIB_{32} (42-60") Mixed brown (10YR 5/3 moist) and yellowish brown (10YR 5/4 moist) stratified loam, clay loam, and sandy loam; weak coarse subangular blocky structure; friable; neutral.

Sawmill Series (107)

Sawmill soils are very dark colored, poorly drained, and developed in bottomlands in silty clay loam alluvial sediments under swamp grass native vegetation. They occur on level to nearly level areas of the floodplains of the major streams in the area. They are found in soil area 11 on the general soil map. Sawmill soils are associated on the floodplain landscape with the Lawson and Otter soils.

One mapping unit is shown on the soil map:

107A Sawmill silty clay loam, 0-2% slopes

A very small part of the total area of Sawmill soils have a thin layer of dark silt loam over the normal Sawmill profile. Periodic flooding is a problem with this soil. Some areas are in cropland, others are in timber or pasture. Permeability is moderate to moderately slow and surface runoff is slow to ponded. Available water capacity is high to very high.

Soil description of Sawmill silty clay loam:

A_p (0-7") Black (10YR 2/1 moist) silty clay loam; weak to moderate medium granular structure; firm; neutral; abrupt smooth boundary.

A_{12} (7-20") Black (10YR 2/1 moist) silty clay loam; moderate medium granular structure; firm; slightly acid; gradual smooth boundary.

A_{13} (20-27") Very dark gray (10YR 3/1 moist) silty clay loam; medium to coarse granular structure; firm; slightly acid to neutral; gradual smooth boundary.

A_3 (27-32") Very dark gray (10YR 3/1 moist) silty clay loam; moderate fine subangular blocky structure; firm; neutral; clear smooth boundary.

B_{21g} (32-40") Very dark gray (10YR 4/1 moist) silty clay loam, with common fine distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/4 + 5/6) mottles; moderate fine to medium subangular blocky structure, with very dark gray (10YR 3/1) clay-organic films; firm; neutral; clear smooth boundary.

B_{22g} (40-50") Gray (10YR 5/1 moist) silty clay loam with few fine distinct yellowish brown (10YR 5/4 + 5/6) mottles; weak medium and coarse subangular blocky structure; with thin very dark gray (10YR 4/1) clay films; firm; neutral; clear smooth boundary.

Cg (50-60") Mixed gray (5Y 5/1 moist) and light olive brown (2.5Y 5/6 moist) silty clay loam; massive; neutral.

Saybrook Series (145)

Saybrook soils are dark colored, moderately well to well drained, and developed in 18 to 40 inches of loess over loam glacial till under prairie native vegetation. They occur on very gently sloping and gently sloping upland areas, mainly in soil area 3 on the general soil map. Saybrook soils are associated on the landscape with the more deeply leached Dana soils, the Flanagan and Catlin soils which have loess thicknesses of 40 to 60 inches over loam till, and the very dark colored poorly drained Drummer soils.

Three mapping units are shown on the soil map:

145B	Saybrook silt loam, 2-4% slopes
145C	Saybrook silt loam, 4-7% slopes
145C2	Saybrook silt loam, 4-7% slopes, eroded

About 18 percent of the total area of Saybrook soils are in the urban area, with the rest mostly in cropland. A few acres of 145B will be moderately eroded and a very few acres will be on nearly level slopes. A very few acres of 145C2 will be severely eroded. Permeability is moderate. Surface runoff is medium. Available water capacity is high. Surface organic matter content averages 4.0 percent.

Soil description of Saybrook silt loam:

A_p (0-9") Black (10YR 2/1 moist) to very dark brown (10YR 2/2 moist) silt loam; weak to moderate fine granular structure; friable; neutral; abrupt smooth boundary.

A_3 (9-13") Very dark grayish brown (10YR 3/2 moist) silt loam; moderate fine granular structure; friable; neutral; clear smooth boundary.

B_1 (13-17") Brown (10YR 4/3 moist) light silty clay loam; moderate fine subangular blocky structure, with thin discontinuous clay films; friable; medium acid; clear smooth boundary.

B_{2t} (17-26") Brown (10YR 4/3 moist) silty clay loam; moderate fine to medium subangular blocky structure, with continuous clay films; firm; medium acid; abrupt smooth boundary.

IIB_3 (26-32") Brown (10YR 4/3 to 5/3 moist) gritty silty clay loam, with few fine faint yellowish brown (10YR 5/4 and 5/8 moist) mottles; moderate fine to medium subangular blocky structure, with continuous clay films; firm; slightly acid; some pebbles; clear smooth boundary.

IIC (32-50") Yellowish brown (10YR 5/4 moist) loam, with common fine faint to distinct yellowish brown (10YR 5/6 and 5/8 moist) and light brownish gray (10YR 6/2 moist) mottles; weak coarse angular blocky structure to massive; friable; calcareous.

Starks Series (132)

Starks soils are light colored, somewhat poorly drained and developed in 24 to 40 inches of loess or silty material over stratified loamy outwash under forest native vegetation. They occur on nearly level stream terraces and upland glacial outwash plains primarily in soil area 10 on the general soil map. They are associated on the landscape with the moderately well to well drained Camden soils.

One mapping unit is shown on the soil map:

132A Starks silt loam, 0-2% slopes

Starks soils are extremely limited in extent in the Champaign-Urbana area, with only 14 acres total, 9 of which are in the urban area, the rest in cropland. Permeability is moderate to moderately slow and surface runoff is slow to medium. Available water capacity is high. Surface organic matter averages 2.0 percent.

Soil description of Starks silt loam:

A_p (0-8") Dark grayish brown (10YR 4/2) silt loam; moderate fine granular structure; friable; slightly acid; abrupt smooth boundary.

A_2 (8-11") Brown (10YR 5/3) silt loam, with few fine faint grayish brown (10YR 5/2) or light brownish gray (10YR 6/2) mottles; weak fine platy structure breaking to moderate fine granular structure; friable; medium acid; abrupt smooth boundary.

B_{1t} (11-15") Brown (10YR 5/3) light silty clay loam, few fine faint grayish brown (10YR 5/2) mottles, few fine prominent dark brown (7.5YR 4/4) mottles; moderate fine and medium subangular blocky structure; firm; thin discontinuous grayish brown (10YR 5/2) clay films; medium acid; clear smooth boundary.

B_{21t} (15-20") Grayish brown (10YR 5/2) silty clay loam, common fine prominent strong brown (7.5YR 5/6) mottles; moderate fine and medium subangular blocky structure; firm; moderately thick continuous light brownish gray (10YR 6/2) clay films; strongly acid; clear smooth boundary.

B_{22t} (20-28") Grayish brown (10YR 5/2) silty clay loam, with common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; continuous light grayish brown (10YR 6/2) clay films; strongly acid; clear smooth boundary.

IIB_{23t} (28-36") Grayish brown (10YR 5/2) silty clay loam, some sand; common medium distinct yellowish brown (10YR 5/6) mottles, many medium distinct olive gray (5Y 5/2) mottles; moderate medium and coarse subangular blocky structure; firm; thin discontinuous light grayish brown (10YR 6/2) clay films; few small soft iron-manganese concretions; strongly acid; clear smooth boundary.

IIB_3 (36-50") Grayish brown (2.5Y 5/2) sandy clay loam, with many coarse prominent yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; firm; few small soft iron-manganese concretions; medium to strongly acid; abrupt smooth boundary.

IIC (50-60") Brown (10YR 4/3) stratified loamy sand, sandy loam or loam; structureless, single grain or massive; friable; medium acid.

Sunbury Series (234)

Sunbury soils are moderately dark colored, somewhat poorly drained, and developed in 40 to 60 inches of loess over loam glacial till under mixed prairie-forest native vegetation. They occur on nearly level to very gently sloping upland loess-covered glacial till plains principally in soil area 6 on the general soil map. Sunbury soils are associated on the landscape with the dark-colored, somewhat poorly drained Flanagan soils, light-colored, somewhat poorly drained Sabina soils, and the dark-colored, poorly drained Drummer soils.

Two mapping units are shown on the soil map:

234A	Sunbury silt loam, 0-2% slopes
234B	Sunbury silt loam, 2-4% slopes

About 17 percent of the Sunbury soils are in urban use, with the remaining majority in cropland, pasture, or sparse forest. A few areas of 234B will have 18 to 40 inches of loess over loam till. Permeability is moderate. Surface runoff is slow to medium. Available water capacity is high. Surface organic matter content averages 3.0 percent.

Soil description of Sunbury silt loam:

A_1 (0-7") Very dark gray (10YR 3/1 moist) silt loam; moderate fine granular structure; friable; neutral; clear smooth boundary.

A_2 (7-11") Dark grayish brown (10YR 4/2 moist) silt loam; weak fine platy structure breaking to weak coarse granular, with thin patchy light gray (10YR 7/1) silt coatings; friable; neutral; clear smooth boundary.

B_1 (11-17") Dark grayish brown (10YR 4/2 moist) light silty clay loam; moderate medium subangular blocky structure, with continuous very dark grayish brown (10YR 3/2) clay films and patchy light gray (10YR 7/1) silt coatings; firm; medium acid; clear smooth boundary.

B_{21t} (17-28") Grayish brown (10YR 5/2 moist) to brown (10YR 5/3 moist) silty clay loam, with many fine distinct grayish brown (2.5Y 5/2) and yellowish brown (10YR 5/4, 5/6, and 5/8) mottles; moderate medium prismatic structure breaking to moderate to strong medium subangular and angular blocky, with continuous very dark grayish brown (10YR 3/2) clay films; firm; medium acid; gradual smooth boundary.

B_{22t} (28-37") Yellowish brown (10YR 5/4 moist) silty clay loam, with many fine distinct yellowish brown (10YR 5/6 and 5/8) and grayish brown (10YR 5/2) mottles; moderate medium prismatic structure breaking to moderate medium angular blocky, with discontinuous very dark grayish brown (10YR 3/2) and very dark gray (10YR 3/1) clay films; firm; medium acid; clear smooth boundary.

B_{31} (37-43") Brown (10YR 5/3 moist) heavy silt loam, with many medium faint to distinct yellowish brown (10YR 5/4 and 5/6) and grayish brown (10YR 5/2) mottles; moderate medium to coarse angular and subangular blocky structure, with patchy very dark grayish brown (10YR 3/2) and very dark gray (10YR 3/1) clay films; friable; slightly acid; clear smooth boundary.

IIB_{32} (43-50") Dark brown (10YR 4/3 moist) loam, with many medium faint to distinct yellowish brown (10YR 5/4 and 5/6) and grayish brown (10YR 5/2) mottles; weak coarse angular blocky structure, with patchy very dark grayish brown (10YR 3/2) and very dark gray (10YR 3/1) clay films; friable; neutral; abrupt smooth boundary.

IIC (50-60") Light olive brown (2.5Y 5/4 moist) loam till; massive; friable; calcareous.

Toronto Series (353)

Toronto soils are moderately dark colored, somewhat poorly drained, and developed in 18 to 40 inches of loess over loam glacial till, leached to greater than 40 inches, under mixed prairie-forest native vegetation. They occur in very gently sloping areas of loess covered upland glacial till plains in soil area 7 on the general soil map. They are associated on the landscape with the light colored Russell and Xenia soils and the dark colored Dana and Raub soils.

One mapping unit is shown on the soil map:

353B Toronto silt loam, 2-4% slopes

Toronto soils are not extensive in the survey area. A few delineations will occur on 0 to 2 percent slopes. Most of these soils are in cropland. Permeability is slow to moderate; surface runoff is slow to medium. Available water capacity is high. Surface organic matter content averages 3.0 percent.

Soil description of Toronto silt loam:

A_p (0-8") Very dark grayish brown (10YR 3/2 moist) silt loam; moderate fine granular structure; friable; slightly acid; abrupt smooth boundary.

A_2 (8-16") Dark grayish brown (10YR 4/2 moist) silt loam; weak fine platy structure to moderate medium granular; friable; medium acid; clear smooth boundary.

B_{1t} (16-22") Dark brown (10YR 4/3 moist) light silty clay loam, with common fine faint to distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/4 and 5/6) mottles; moderate fine subangular blocky structure, with discontinuous very dark brown (10YR 2/2) clay films and patchy light gray (10YR 5/1 and 6/1) silt coatings; firm; strongly acid; clear smooth boundary.

B_{21t} (22-29") Dark grayish brown (10YR 4/2 moist) silty clay loam, with common fine faint to distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/6 and 5/8) mottles; moderate to strong medium subangular and angular blocky structure, with continuous very dark brown (10YR 2/2) clay films; firm; strongly acid; few fine Fe-Mn concretions; clear smooth boundary.

IIB_{22t} (29-36") Yellowish brown (10YR 5/4 moist) to light olive brown (2.5Y 5/4) clay loam, with common medium faint grayish brown (10YR 5/2) and yellowish brown (10YR 5/6 and 5/8) mottles; moderate medium to coarse angular blocky structure, with discontinuous very dark grayish brown (10YR 3/2) clay films; firm; strongly acid; clear smooth boundary.

IIB_{3t} (36-45") Yellowish brown (10YR 5/4 moist) clay loam, with common medium distinct light brownish gray (2.5Y 6/2) mottles; weak coarse angular blocky structure, with patchy very dark grayish brown (10YR 3/2) clay films; firm; medium acid; few fine Fe-Mn concretions; clear smooth boundary.

IIC (45-50") Light olive brown (2.5Y 5/4 moist) loam till, with many medium faint light brownish gray (10YR 6/2) and grayish brown (10YR 5/2) mottles; massive; firm; calcareous.

Virgil Series (104)

Virgil soils are moderately dark colored, somewhat poorly drained and developed in 40 to 60 inches of loess over loamy stratified outwash under mixed prairie-forest native vegetation. They occur on the nearly level terraces and low uplands adjacent to streams. They are found principally in soil area 9 on the general soil map. They are associated on the landscape with the moderately dark colored, moderately well to well drained Batavia soils, the dark colored, somewhat poorly drained Elburn soils, and the very dark colored, poorly drained Drummer soils.

One mapping unit is shown on the soil map:

104A Virgil silt loam, 0-2% slopes

A small portion of the Virgil soils will be moderately well drained. In the Champaign-Urbana area all the Virgil soils are in urban areas. Permeability is moderate, and surface runoff is slow to medium. Available water capacity is high. Surface organic matter content averages 3.0 percent.

Soil description of Virgil silt loam:

A_1 (0-7") Black (10YR 2/1 moist) silt loam; moderate fine to medium granular structure; friable; neutral; clear smooth boundary.

A_2 (7-14") Dark grayish brown (10YR 4/2 moist) silt loam, with few fine distinct dark yellowish brown (10YR 5/4) mottles; weak thin platy structure; friable; medium acid; clear smooth boundary.

B_1 (14-18") Grayish brown (10YR 5/2 moist) to dark grayish brown (10YR 4/2 moist) silty clay loam with few fine distinct dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure, with light gray (10YR 7/1-7/2) patchy silt coatings; firm; medium to strongly acid; clear smooth boundary.

B_{21t} (18-25") Grayish brown (10YR 5/2 moist) to brown (10YR 5/3 moist) silty clay loam, with common fine distinct yellowish brown (10YR 5/4, 5/6, 5/8) mottles; moderate fine subangular blocky structure, with dark grayish brown (10YR 4/2) clay films; many Fe-Mn concretions; firm; strongly acid; clear smooth boundary.

B_{22t} (25-35") Grayish brown (10YR 5/2 moist) silty clay loam, with common fine distinct yellowish brown (10YR 5/4, 5/6, 5/8) mottles; weak medium prismatic structure breaking to medium subangular blocky, with dark grayish brown (10YR 4/2) clay films; many fine Fe-Mn concretions; firm; strongly acid; clear smooth boundary.

B_{23t} (35-42") Grayish brown (10YR 5/2 moist) silty clay loam, with many medium distinct yellowish brown (10YR 5/4, 5/6, 5/8) mottles; weak medium prismatic structure breaking to medium to coarse angular blocky, with patchy clay films; many Fe-Mn concretions; firm; medium acid; clear smooth boundary.

B_{31} (42-48") Grayish brown (2.5Y 5/2 moist) light silty clay loam, with many medium distinct yellowish brown (10YR 5/6, 5/8) mottles; weak medium to coarse angular blocky structure, with patchy clay films; many Fe-Mn concretions; friable; slightly acid; clear smooth boundary.

IIB_{32} (48-56") Grayish brown (2.5Y 5/2 moist) loam to light clay loam, with many medium prominent yellowish brown (10YR 5/6, 5/8) mottles; weak coarse angular blocky structure, with patchy clay films; many Fe-Mn concretions; friable; neutral; gradual smooth boundary.

IIC (56-60") Mixed grayish brown (2.5Y 5/2 moist) and brown (10YR 4/3 moist) heavy sandy loam stratified with sands and silts; massive; many fine Fe-Mn concretions; mildly alkaline.

Ward Series (207)

Ward soils are light colored, poorly drained, and developed in 40 to 60 inches of loess over loam glacial till under forest native vegetation. They occur on nearly level to depressional areas in soil area 6 on the general soil map. They are associated on the landscape with the somewhat poorly drained Sabina and the moderately well to well drained Russell soils.

One mapping unit is shown on the soil map:

207A Ward silt loam, 0-2% slopes

The total acreage of this soil is small in the survey area with about 10 percent in the urban area. Permeability is slow. Surface runoff is slow to ponded. Available water capacity is high. Surface organic matter content averages 2.0 percent.

Soil description of Ward silt loam:

Ap (0-8") Dark grayish brown (10YR 4/2 moist) silt loam; moderate fine to medium crumb structure; friable; very strongly acid; abrupt smooth boundary.

A_2 (8-12") Grayish brown (10YR 5/2 moist) silt loam; moderate to strong fine platy structure; friable; very strongly acid; many fine Fe-Mn concretions; abrupt smooth boundary.

B_{21tg} (12-17") Dark gray (10YR 4/1 moist) silty clay loam, with few fine faint dark grayish brown (10YR 4/2) mottles; moderate to strong fine subangular blocky structure; firm; very strongly acid; many fine Fe-Mn concretions; clear smooth boundary.

B_{22tg} (17-25") Dark gray (10YR 4/1 moist) light silty clay loam, with common fine distinct yellowish brown (10YR 5/4 and 5/6) mottles; moderate fine prismatic structure breaking to moderate medium angular and subangular blocky structure, with continuous very dark gray (10YR 3/1) clay organic films; firm; strongly acid; many fine Fe-Mn concretions; clear smooth boundary.

B_{23tg} (25-37") Olive gray (5Y 5/2 moist) and olive (5Y 5/3 moist) silty clay, with common fine distinct yellowish brown (10YR 5/6 and 5/8) mottles; strong medium prismatic structure breaking to moderate to strong medium to coarse angular blocky, with discontinuous very dark gray (10YR 3/1) clay films; firm; medium acid; many fine Fe-Mn concretions; gradual smooth boundary.

B_{31tg} (37-48") Olive gray (5Y 5/2 moist) light silty clay loam, with common fine distinct yellowish brown (10YR 5/6 and 5/8) mottles; very weak medium to coarse prismatic structure breaking to weak to moderate medium to coarse angular blocky, with discontinuous very dark grayish brown (2.5Y 3/2) clay films; firm; slightly acid; many fine Fe-Mn concretions; gradual smooth boundary.

B_{32tg} (48-58") Olive gray (5Y 5/2 moist) light silty clay loam, with many fine to medium distinct yellowish brown (10YR 5/4, 5/6, and 5/8) mottles; very weak coarse angular blocky structure; firm; neutral; many fine Fe-Mn concretions; clear smooth boundary.

IIC_g (58-66") Mixed olive gray (5Y 5/2 moist) and yellowish brown (10YR 5/6 and 5/8 moist) loam till; massive; friable; mildly alkaline; many fine Fe-Mn concretions.

Xenia Series (291)

Xenia soils are light colored, moderately well drained, and developed in 18 to 40 inches of loess on loam glacial till under forest native vegetation. They occur on very gently sloping areas in the upland in soil area 6 on the general soil map. They are associated on the landscape with the well drained Russell and the poorly drained Fincastle soils.

One mapping unit is shown on the soil map:

291B Xenia silt loam, 2-4% slopes

Some areas of Xenia soils will have moderately dark surface horizons and a few areas will be moderately eroded. Permeability is moderate to moderately slow. Surface runoff is slow to medium. Available water capacity is high. Surface organic matter content averages 2.0 percent.

Soil description of Xenia silt loam:

A_1 (0-4") Dark brown (10YR 3/3 moist) silt loam; moderate fine crumb structure; friable; slightly acid; abrupt smooth boundary.

A_2 (4-10") Dark grayish brown (10YR 4/2 moist) to grayish brown (10YR 5/2 moist) silt loam; moderate fine platy structure; friable; medium acid; clear smooth boundary.

B_1 (10-14") Dark brown (10YR 4/3 moist) light silty clay loam; weak fine subangular blocky structure, with some patchy grayish brown (10YR 5/2) silt coatings; friable; strongly acid; clear smooth boundary.

B_{21t} (14-20") Dark brown (10YR 4/3 moist) silty clay loam; moderate medium subangular blocky structure, with patchy light gray (10YR 6/1 and 7/1) silt coatings; firm; strongly acid; clear smooth boundary.

B_{22t} (20-28") Dark brown (10YR 4/3 moist) silty clay loam, with few fine distinct brown (10YR 5/3) and yellowish brown (10YR 5/6) mottles; strong medium subangular blocky structure, with discontinuous dark grayish brown (10YR 4/2) clay films; firm; medium acid; clear smooth boundary.

IIB_{23t} (28-38") Dark brown (10YR 4/3 moist) to dark yellowish brown (10YR 4/4 moist) clay loam, with common fine faint brown (10YR 5/3) and grayish brown (10YR 5/2) mottles; moderate medium to coarse angular blocky structure, with some patchy dark brown (10YR 3/3) clay coatings; firm; medium acid; clear smooth boundary.

IIB_{31t} (38-48") Brown (10YR 5/3 moist) to olive brown (2.5Y 5/4 moist) clay loam, with common medium distinct yellowish brown (10YR 5/6 and 5/8) mottles; weak coarse angular blocky structure, with patchy brown (10YR 4/3) clay films; firm; slightly acid; gradual smooth boundary.

IIB_{32} (48-57") Light olive brown (2.5Y 5/4 moist) light clay loam, weak coarse angular blocky structure, with patchy dark grayish brown (10YR 4/2) clay films; friable; neutral; abrupt smooth boundary.

IIC (57-65") Light olive brown (10YR 5/4 moist) loam till; massive; firm to friable; calcareous.

TAXONOMIC CLASSIFICATION OF CHAMPAIGN-URBANA AREA SOILS

Soils are classified so that we can more easily remember their significant characteristics, assemble knowledge about them, see their relationship to one another, and understand their behavior and their response to the whole environment. Through classification and the use of soil maps, we can apply our knowledge of soils to specific tracts of land.

The current system of soil classification used by the National Cooperative Soil Survey was adopted in 1965 and is under continual study. Those interested in the development of the system should refer to the latest literature available (USDA, 1960; Simonson, 1962; USDA, 1970).

The current system consists of six categories. Beginning with the most inclusive, these categories are order, suborder, great group, subgroup, family, and finally the series. The criteria for classification are soil properties that are measurable or observable, but the properties are selected so that soils of similar genesis are grouped together. Placement of some series in the current system of classification, particularly in families, may change as more precise information becomes available.

Table 3 shows the classification of the soil series in the Champaign-Urbana area according to the current system. The soil taxonomic key, Table 4, indicates the relationship of the various soils in the survey area to their parent materials and the several categories in the soil classification system.

Order

Soils are grouped into orders according to properties that seem to have resulted from the same processes acting to about the same degree on the parent material. Ten soil orders are recognized in the current system: Entisols, Vertisols, Inceptisols, Aridisols, Mollisols, Spodosols, Alfisols, Ultisols, Oxisols, and Histosols. The Inceptisols, Mollisols, Alfisols, and Histosols are represented in the Champaign-Urbana area. Inceptisols occur mostly on

young, but not recent, land surfaces. Mollisols have a thick, dark-colored surface layer, moderate to strong structure, and base saturation of more than 50 percent. Alfisols contain accumulated aluminum and iron, have argillic or natric horizons, and have a base saturation of more than 35 percent. Histosols are organic soils.

Suborder

Each order is divided into suborders, primarily on the basis of soil characteristics that indicate genetic similarity. The suborders have a narrower climatic range than the order. The criteria for suborders reflects either the presence or absence of waterlogging or soil differences resulting from climate or vegetation.

Great Group

Each suborder is divided into great groups, on the basis of uniformity in kind and sequence of genetic horizons.

Subgroup

Each great group is divided into subgroups, one representing the central (typic) concept of the group, and others called intergrades made up of soils that have mostly the properties of one great group but also one or more properties of another great group.

Family

Families are established within subgroups, primarily on the basis of properties important to plant growth. Some of these properties are: texture, mineralogy, reaction, soil temperature, permeability, consistence, and thickness of horizons.

Series

The series has the narrowest range of characteristics of the categories in the classification system.

The series is rather uniform in certain characteristics and arrangement of horizons. If genetic horizons are thin or absent, as in some alluvial soils for example, the series are uniform in soil properties within a defined depth limit, usually the upper 40 inches. A soil series is a group of soils which has developed from a particular kind of parent material and has genetic horizons similar in differentiating characteristics and arrangement in the profile.

These differentiating characteristics include such morphological features as kind, thickness, and arrangement of horizons, as well as their color, structure, reaction, consistence, mineralogical and chemical composition, and texture below the A horizon.

Table 3. — Taxonomic Classification of Soils in the Champaign-Urbana Area

Soil Series and Soil Type Number		Classification
Dodge	(24)	Typic Hapludalfs; fine silty, mixed, mesic
Hennepin	(25)	Typic Eutrochrepts; fine loamy, mixed, mesic
Miami	(27)	Typic Hapludalfs; fine loamy, mixed, mesic
Dana	(56)	Typic Argiudolls; fine silty, mixed, mesic
LaRose	(60)	Typic Argiudolls; fine loamy, mixed, mesic
Harpster	(67	Typic Calciaquolls; fine silty, mixed, mesic
Otter	(76)	Cumulic Haplaquolls; fine silty, mixed, mesic
Houghton	(103)	Typic Medasaprist; euic, mesic
Virgil	(104)	Udollic Ochraqualfs; fine silty, mixed, mesic
Batavia	(105)	Mollic Hapludalfs; fine silty, mixed, mesic
Sawmill	(107)	Cumulic Haplaquolls; fine silty, mixed, mesic
Starks	(132)	Aeric Ochraqualfs; fine silty, mixed, mesic
Camden	(134)	Typic Hapludalfs; fine silty, mixed, mesic
Brooklyn	(136)	Mollic Albaqualfs; fine, montmorillonitic, mesic
Saybrook	(145)	Typic Argiudolls; fine silty, mixed, mesic
Proctor	(148)	Typic Argiudolls; fine silty, mixed, mesic
Brenton	(149)	Aquic Argiudolls; fine silty, mixed, mesic
Drummer	(152)	Typic Haplaquolls; fine silty, mixed, mesic
Flanagan	(154)	Aquic Argiudolls; fine, montmorillonitic, mesic
Catlin	(171)	Typic Argiudolls; fine silty, mixed, mesic
Elburn	(198)	Aquic Argiudolls; fine silty, mixed, mesic
Plano	(199)	Typic Argiudolls; fine silty, mixed, mesic
Ward	(207)	Typic Ochraqualfs; fine, montmorillonitic, mesic
Parr	(221)	Typic Argiudolls; fine loamy, mixed, mesic
Birkbeck	(233)	Typic Hapludalfs; fine silty, mixed, mesic
Sunbury	(234)	Aquollic Hapladalfs; fine, montmorillonitic, mesic
Sabina	(236)	Aeric Ochraqualfs; fine, montmorillonitic, mesic
Kendall	(242)	Aeric Ochraqualfs; fine silty, mixed, mesic
St. Charles	(243)	Typic Hapludalfs; fine silty, mixed, mesic
Xenia	(291)	Aquic Hapludalfs; fine silty, mixed, mesic
Russell	(322)	Typic Hapludalfs; fine silty, mixed, mesic
Peotone	(330)	Cumulic Haplaquolls; fine, montmorillonitic, mesic
Toronto	(353)	Udollic Ochraqualfs; fine silty, mixed, mesic
Atlanta	(385)	Mollic Hapludalfs; fine silty, mixed, mesic
Lawson	(451)	Cumulic Hapludolls; fine silty, mixed, mesic
Raub	(481)	Aquic Argiudolls; fine silty, mixed, mesic
Fincastle	(496)	Aeric Ochraqualfs; fine silty, mixed, mesic

Table 4. — Taxonomic Key for the Classification of Soils in the Champaign-Urbana Area

	PARENT MATERIAL	ORDER →	INCEPTISOLS	MOLLISOLS						ALFISOLS								HISTISOLS
		SUBORDER →	OCHREPTS	UDOLLS			AQUOLLS			UDALFS				AQUALFS				SAPRISTS
		GREAT GROUP →	EUTROCHREPTS	HAPLUDOLLS	ARGIUDOLLS		HAPLAQUOLLS		CALCIAQUOLLS	HAPLUDALFS				OCHRAQUALFS			ALBAQUALFS	MEDASAPRISTS
		SUBGROUP →	TYPIC	CUMULIC	TYPIC	AQUIC	TYPIC	CUMULIC	TYPIC	TYPIC	AQUIC	MOLLIC	AQUOLLIC	AERIC	UDOLLIC	TYPIC	MOLLIC	TYPIC
UPLAND SOILS	Loess (18-40") over loamy stratified outwash; B in both materials; calcareous below 40"	FAMILY ↓																
		fine silty, mixed mesic			148 Proctor	149 Brenton				134 Camden				132 Starks				
		fine, mont., mesic						330 Peotone										
	Loess (40-60") over loamy outwash; B mostly in loess	fine silty, mixed, mesic			199 Plano	198 Elburn	152 Drummer		67 Harpster	243 St. Charles		105 Batavia		242 Kendall	104 Virgil			
		fine, mont., mesic															136 Brooklyn	
	Loam till; calcareous by 24"	fine loamy, mixed, mesic	25 Hennepin		60 LaRose													
	Loess (0-18") over loam fill; B in till; calcareous 24-40"	fine loamy, mixed, mesic			221 Parr					27 Miami								
	Loess (18-36") over loam till; B in both materials; calcareous 24-40"	fine silty, mixed, mesic			145 Saybrook					24 Dodge								
	Loess (18-40") over loam till; B in both materials; calcareous below 40"	fine silty, mixed, mesic			56 Dana	481 Raub				322 Russell	291 Xenia			496 Fincastle	353 Toronto			
	Loess (40-60") over loam till, B mostly in loess; calcareous below 40"	fine silty, mixed, mesic			171 Catlin		152 Drummer		67 Harpster			385 Atlanta						
		fine, mont., mesic				154 Flanagan		330 Peotone					234 Sunbury	236 Sabina		207 Ward		
BOTTOM-LAND SOILS	Silt loam stream alluvium	fine silty, mixed, mesic		451 Lawson				76 Otter										
	Silty clay loam stream alluvium	fine silty, mixed, mesic						107 Sawmill										
ORGANIC SOILS	Muck	euic, mesic																103 Houghton

CHEMICAL ANALYSES AND PARTICLE SIZE DISTRIBUTION OF SELECTED SOILS IN THE CHAMPAIGN-URBANA AREA

Selected chemical and physical properties of several soils occurring in the Champaign-Urbana area are given in Table 5 .

Profiles 1 and 3 (Atlanta and Elburn) are from Trelease Woods in the northeast part of the survey area (Geis et al., 1970). Profile 4 (Flanagan) was analyzed by Sattler in a thesis study (Sattler, 1957). Profiles 5 and 6 (Flanagan) are from the Morrow Plots analyzed by Guernsey (Guernsey et al., 1969). Profiles 2 and 7 (Drummer and Proctor) are soil correlation profiles from Illinois. Profiles 8 and 9 (Toronto and Xenia) were analyzed by Bailey (Bailey et al., 1964).

Table 5. — Chemical Analyses and Particle Size Distribution of Selected Soils in the Champaign-Urbana Area

Soil and location	Horizon	Depth inches	pH	Organic matter (%)	Exchangeable cations me./100 gm. Ca	Mg	K	Na	Cation exchange capacity me./100 gm	% base saturation	Percent of Particle Size Sand 2-.05 mm.	Silt .05-.002 mm.	Clay .002 mm.
Profile 1:													
Atlanta silt loam	A1	0-6	6.0	5.3	15.0	3.3	.3	.3	23.3	81	6.3	74.7	19.0
T19N, R9E, Sec. 1,	A2	6-12	5.4	2.6	12.7	3.3	.2	.3	20.7	80	6.0	69.0	25.0
SW160, SW40, NE10	B1t	12-17	5.5	1.9	13.5	4.0	.3	.3	22.3	81	5.5	63.5	31.0
	B21t	17-26	5.2	1.1	15.2	6.4	.5	.4	27.7	81	3.1	59.4	37.5
	B22t	26-39	4.9	.6	14.5	7.2	.5	.4	28.6	79	3.8	62.9	33.3
	B31t	39-45	5.0	.5	13.0	7.0	.4	.3	25.6	81	4.5	65.7	29.8
	IIB3t	45-54	5.9	.4	12.7	6.6	.4	.4	22.9	88	18.3	55.2	26.5
	IIC	54-65	Calc	.3	16.5	6.2	.1	.3	----	100	36.3	36.9	26.8
Profile 2:													
Drummer silty clay loam	A1	0-7	5.5	7.1	21.2	7.0	.4	--	33.5	85	9.5	60.2	30.3
T19N, R9E, Sec. 19,	A12	7-14	6.2	6.0	25.0	8.3	.4	.1	34.3	98	10.4	58.4	31.2
SW160, SE40, SW10	B1	14-19	6.7	2.5	19.4	8.0	.4	.1	27.7	100	10.2	58.9	30.9
	B21g	19-25	7.0	1.2	17.8	8.4	.4	.1	26.0	100	7.1	60.0	32.9
	B22g	25-32	7.1	.6	19.8	10.3	.5	.1	28.7	100	3.5	59.5	37.0
	B23g	32-40	7.2	.5	16.7	8.8	.4	.1	23.4	100	4.3	64.1	31.6
	IIB3	40-46	7.3	.4	11.1	5.6	.3	--	15.3	100	17.0	60.1	23.0
	IIC	46-60	7.5	.3	6.4	3.1	.2	--	8.8	100	56.3	26.8	16.9
Profile 3:													
Elburn silt loam	A1	0-10	6.2	4.4	17.7	4.0	.3	.4	26.4	85	3.5	71.7	24.8
T19N, R9E, Sec. 1,	A3	10-14	5.3	3.0	14.7	3.8	.3	.3	25.5	75	3.2	66.0	30.8
SW160, NW50, NW10	B1	14-20	5.4	2.6	15.0	4.1	.3	.3	25.5	77	3.2	63.3	33.5
	B21t	20-32	5.5	1.3	16.7	6.0	.4	.3	28.0	84	2.2	62.8	35.0
	B22t	32-40	5.7	.7	15.7	7.0	.4	.4	25.9	91	3.4	65.9	30.7
	B31	40-49	6.3	.7	14.0	7.0	.3	.4	25.0	87	7.6	64.9	27.5
	IIB32	49-65	7.4	.7	13.0	6.4	.3	.4	21.3	94	52.0	18.0	30.0
	IIC	65-90	Calc	.2	----	---	--	--	----	100	44.7	36.3	19.0
Profile 4:													
Flanagan silt loam	A1	0-8	5.5	5.1	----	---	--	--	20.3	73	5.8	69.0	25.2
T19N, R9E, Sec. 19,	A12	8-15	5.5	3.6	----	---	--	--	20.5	77	4.1	67.8	28.1
SW160, NE40, NW10	A3	15-18	5.4	2.8	----	---	--	--	20.6	78	2.8	67.6	29.6
	B1t	18-23	5.6	1.9	----	---	--	--	25.9	85	2.5	61.4	36.1
	B2t	23-32	5.4	1.0	----	---	--	--	26.5	89	1.9	66.6	38.3
	B31t	32-38	6.3	.9	----	---	--	--	21.8	100	2.8	64.8	32.4
	B32	38-45	7.0	.8	----	---	--	--	17.3	100	8.2	66.8	25.0
	IIC1	45-49	7.8	.4	----	---	--	--	----	100	21.5	61.0	16.9
	IIC2	49-58	Calc	.3	----	---	--	--	----	100	32.0	49.1	18.9
Profile 5:													
Flanagan silt loam	Ap	0-10	5.8	3.3	10.4	4.5	.4	.1	21.5	72	6.4	67.1	26.5
T19N, R9E, Sec. 18,	A1	10-18	5.7	3.3	13.1	4.3	.3	.2	24.1	74	3.6	65.5	30.9
SE160, NW40, NE10	B1t	18-23	5.7	2.1	14.3	5.7	.4	.1	25.8	79	2.8	62.9	34.3
	B21t	23-29	6.0	1.0	16.2	8.6	.5	.2	28.9	88	1.8	58.0	40.2
	B22t	29-37	6.6	.5	15.2	8.2	.5	.1	25.7	93	2.7	63.9	33.4
	B3	37-45	7.2	.4	11.9	6.7	.4	.1	19.2	99	9.4	62.9	27.7
	IIC1	45-69	Calc	---	----	---	--	--	----	--	15.3	71.1	13.6
	IIC2	69-72	Calc	---	----	---	--	--	----	--	48.0	43.0	9.0
Profile 6:													
Flanagan silt loam	Ap	0-9	5.1	2.3	8.8	2.3	.2	.1	17.6	65	9.0	66.8	24.2
T19N, R9E, Sec. 18,	A12	9-12	5.3	2.6	9.7	2.7	.2	.1	18.0	71	8.4	64.8	26.8
SE160, NW40, NE10	B1t	12-15	6.0	2.1	13.4	5.5	.1	.1	23.1	83	5.6	58.7	35.7
	B21t	15-22	6.2	1.1	15.8	7.5	.1	.1	26.0	90	5.2	54.8	40.0
	B22t	22-30	6.7	.9	13.6	7.1	.1	.1	22.7	92	7.6	57.6	34.8
	B3	30-49	7.5	.4	11.2	5.8	.1	.1	16.8	100	12.7	60.9	26.4
	IIC1	49-58	Calc	.4	----	---	--	--	----	100	26.7	57.1	16.2
	IIC2	58-72	Calc	.2	----	---	--	--	----	100	26.4	55.6	18.0
Profile 7:													
Proctor silt loam	Ap	0-8	5.4	3.2	9.8	2.2	.6	.1	16.7	76	13.0	63.3	23.7
T19N, R9E, Sec. 34,	A3	8-14	5.6	2.4	10.3	3.4	.3	.1	18.8	75	7.9	63.4	28.7
NE160, NW40, NE10	B21t	14-19	5.5	1.3	11.7	6.7	.3	.2	23.5	80	2.0	63.2	34.8
	B22t	19-27	5.5	1.0	10.3	6.6	.3	.2	21.3	82	1.3	66.4	32.3
	B23t	27-36	5.6	.8	9.4	6.1	.2	.1	19.0	84	1.6	69.5	28.9
	IIB31t	36-44	5.8	.3	5.0	3.3	.7	.1	10.2	89	38.4	46.1	15.5
	IIB32	44-50	5.9	.3	3.1	2.0	.1	.1	6.4	82	45.5	44.1	10.4
	IIC1	50-66	5.7	.3	2.8	1.9	.1	.1	5.7	87	63.3	25.8	10.9
	IIC2	66-80	6.1	.2	1.5	1.2	.1	.1	3.4	81	89.0	4.9	6.1
Profile 8:													
Toronto silt loam	A1	0-8	6.5	6.6	20.7	2.8	.3	.3	28.9	92	3.6	73.0	23.4
T19N, R9E, Sec. 1,	A21	8-14	5.9	3.3	12.0	3.0	.1	--	20.6	80	3.7	72.2	24.1
SW160, SW40, NW10	A22	14-18	5.5	2.7	11.5	4.4	.1	--	22.8	77	3.8	67.7	28.5
	B1t	18-22	5.2	2.3	11.0	6.1	.1	.3	24.2	76	4.0	64.2	31.8
	B21t	22-29	5.0	2.1	10.7	6.3	.1	.4	25.6	72	4.9	61.7	33.5
	IIB22t	29-36	5.1	2.1	9.2	5.8	.2	--	21.7	75	13.7	57.4	28.9
	IIB3	36-45	5.8	1.8	8.2	5.7	.1	.3	16.6	91	22.4	53.8	23.8
	IIC	45-51	Calc	---	14.7	6.7	.1	--	----	100	39.2	44.5	16.3
Profile 9:													
Xenia silt loam	A1	0-4	7.1	6.3	21.0	2.4	.5	--	25.4	99	3.6	78.1	18.3
T20N, R9E, Sec. 34,	A2	4-10	7.6	2.4	13.1	2.1	.2	--	15.3	97	3.0	79.6	17.4
SE160, SE40, SW10	A3	10-14	7.1	1.4	10.7	4.0	.4	--	17.8	91	2.7	72.1	25.2
	B1	14-18	6.9	1.5	9.7	5.7	.2	--	20.2	85	2.8	68.9	28.3
	B21t	18-28	5.5	1.3	7.3	5.6	.2	--	21.6	65	3.3	66.7	30.0
	IIB22t	28-38	4.7	1.1	4.1	4.3	.2	--	17.9	54	17.0	57.2	25.8
	IIB31t	38-48	4.8	1.0	3.7	5.5	.1	--	15.4	68	32.9	41.9	25.2
	IIB32t	48-57	6.7	.9	5.0	6.9	.1	--	13.0	98	35.0	40.8	24.2
	IIC	57-70	Calc	---	12.6	5.1	.1	--	8.6	100	35.1	44.2	20.7

Capability Groups of Soils

Capability classification is the grouping of soils to show, in a general way, their suitability for most kinds of farming. It is a practical classification based on the limitations of the soils, the risk of damage when they are used for the ordinary field crops or sown pastures, and the way they respond to treatment. The classification does not apply to horticultural crops, and other crops that have their own special requirements for economical production. The soils are classified according to degree and kind of permanent limitations, but without consideration of major and generally expensive landforming that would change the slope, depth, or other characteristics of the soils, and without consideration of possible major reclamation. A complete discussion of the capability classification is given in Agriculture Handbook 210, Land Capability Classification (Klingebiel and Montgomery, 1966).

For soil management groupings in the capability system, all the soils are grouped at three levels, the capability class, subclass, and management group.

Capability classes, the broadest grouping, are designated by Roman numerals I through VIII. As the numerals increase they indicate progressively greater limitations and narrower choices for practical use.

The classes are defined as follows:

Class I. Soils with few limitations that restrict their use.

Class II. Soils with some limitations that reduce the choice of plants or require moderate conservation practices.

Class III. Soils with severe limitations that reduce the choice of plants or require special conservation practices, or both.

Class IV. Soils with very severe limitations that restrict the choice of plants or require very careful management, or both.

Class V. Soils subject to little or no erosion but with other limitations, impractical to remove, that limit their use largely to pasture, range, woodland, or wildlife food and cover.

Class VI. Soils with severe limitations that make them generally unsuited to cultivation without major reclamation and limit their use largely to pasture, range, woodland, or wildlife food and cover.

Class VII. Soils with very severe limitations that make them unsuited to cultivation without major reclamation and restrict their use largely to range, woodland, or wildlife food and cover.

Class VIII. Soils and landforms with limitations that preclude their use for commercial plant production without major reclamation and restrict their use to recreation, wildlife, water supply, or esthetic purposes.

Classes V, VII, and VIII are not used in this survey area.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, e or w to the class numeral, for example, IIe. The letter e indicates the main limitation is risk of erosion; w indicates water on or in the soil interferes with plant growth or cultivation.

Management groups, sometimes called capability units, are soil groups within the subclasses. Different management groups are designated by adding a number to the subclass symbol, for example, IIe-1. The

soils in one management group are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. A listing of the management group classification of the soils in Champaign-Urbana area is given in Table 1 and in the following paragraphs.

Champaign-Urbana Area Soil Management Groups

In the following pages each of the management groups in Champaign-Urbana area is described. Suggestions for use and management of the soils in each group are given. The names of the soil series represented are mentioned in the description of each group, but this does not mean that all the soils in a given series are in the management group. Made land, industrial land, gravel pits and borrow pits are not listed in management groups.

Management Group I-1

This group consists of deep, nearly level, moderately well-drained to well-drained, silty soils on uplands and terraces. These soils are members of the Birkbeck, Camden, Plano, Proctor, and St. Charles series. They have moderate permeability and high available water capacity. They have high natural fertility and are naturally slightly acid to medium acid. With sound management practices these soils are capable of sustained high yields of all adapted crops. Erosion is not a serious hazard.

Soils of this group are well suited to corn, soybeans, and small grain. They are seldom used for hay and pasture. Row crops can be grown intensively.

The following soil mapping units are in management group I1: 134A, 148A, 199A, 233A, and 243A.

Management Group I-2

This group consists of deep, nearly level, somewhat poorly drained, silty soils on uplands and terraces. These soils are members of the Brenton, Elburn, Flanagan, Raub, Sabina, Sunbury, and Virgil series. They have moderate permeabilty and high available water capacity. They have high natural fertility and are naturally slightly acid to medium acid. With sound management practices and adequate drainage these soils are capable of sustained high yields of all adapted crops. Tile drainage is commonly used. Erosion is not a serious hazard.

Soils of this group are well suited to corn, soybeans, and small grain. They are seldom used for hay and pasture. Row crops can be grown intensively.

The following soil mapping units are in management group I-2: 104A, 149A, 154A, 198A, 234A, 236A, and 481A.

Management Group IIe-1

This group consists of deep, gently sloping to moderately sloping, moderately well-drained to well-drained silty soils on uplands and terraces. These soils are members of the Atlanta, Batavia, Birkbeck, Camden, Catlin, Dana, Dodge, Fincastle, LaRose, Miami, Parr, Plano, Proctor, Russell, St. Charles, Saybrook, Toronto and Xenia series. They have moderate permeability and high available water capacity. They have high natural fertility and are naturally slightly acid to medium acid.

Soils of this group are well suited to corn, soybeans, and small grain, and to grass and legumes grown for hay or pasture. Row crops can be grown intensively if erosion is controlled.

All conservation practices are relatively easy to establish in these areas. Adequate conservation practices hold soil losses to a minimum,

conserve moisture, and make these soils capable of producing sustained high yields of all adapted crops.

The following soil mapping units are in management group IIe-1: 24B, 24C, 24C2, 27B, 27C, 27C2, 56B, 56B2, 56C, 56C2, 60C, 105B, 134B, 134C, 145B, 145C, 145C2, 148B, 148C, 148C2, 171B, 171C, 199B, 221B, 221C, 221C2, 233B, 233B2, 233C, 233C2, 243B, 291B, 322B, 322B2, 322C, 322C2, 353B, 385B, and 496B.

Management Group IIe-2

This group consists of deep, gently sloping, somewhat poorly drained, silty soils on uplands and terraces. These soils are members of the Brenton, Elburn, Flanagan, Kendall, Raub, Sabina, and Sunbury series. They have moderate permeability and high available water capacity. They have high natural fertility and are naturally slightly acid to medium acid.

Soils of this group are well suited to corn, soybeans, and small grain, and to grass and legumes grown for hay or pasture. Row crops can be grown intensively if erosion is controlled. Tile are often needed in areas of these soils to improve the drainage and dry out the grassed waterways.

The following soil mapping units are in management group IIe-2: 149B, 154B, 198B, 234B, 236B, 242B, and 481B.

Management Group IIw-1

This group consists of deep, nearly level, poorly drained soils on uplands and terraces. These soils are members of the Drummer and Harpster series. They have moderate to moderately slow permeability and a high water table, and some areas are subject to ponding. They have high natural fertility and available water capacity. Typically, they have a surface layer and subsoil of silty clay loam. These soils are neutral in reaction. Harpster soils are calcareous.

Soils of this group are well suited to corn and soybeans, and they can be grown intensively. Small grains, hay or pasture are only important on livestock farms.

Artificial drainage is needed because of the high water table and ponding. Although most areas contain tile, many would benefit from additional tile drains and improved outlet ditches.

The following soil mapping units are in management group IIw-1: 67A and 152A.

Management Group IIw-2

This group consists of nearly level to gently sloping floodplain soils. These soils are members of the Lawson, Otter and Sawmill series. They have moderate to moderately slow permeability and high available water capacity. These soils have poor, somewhat poor, and moderately good natural drainage. All are in the river and stream valleys that are subject to frequent flooding. They have high natural fertility and high available moisture capacity. Sawmill soils have silty clay loam textures and the others have silt loam or loam textures. Lawson and Sawmill soils are neutral in reaction.

Soils of this group are well suited to corn and soybeans. If the flooding hazard is too severe for row crops, the soils are used for pasture, but they are seldom used for small grain and hay.

When practical, flood protection and adequate drainage by tile or open ditch will improve yields.

The following soil mapping units are in management group IIw-2: 76A, 107A, and 451A.

Management Group IIw-3

This group consists of nearly level, poorly drained soils on uplands and terraces. These soils are members of the Brooklyn and Ward series. They have slow permeability, high water-holding capacity, and

a high water table. Some areas are subject to ponding. Brooklyn soils have a thick dark gray silt loam horizon over a silty clay loam subsoil. They are slightly acid to neutral in reaction.

These soils are suited to corn and soybeans. Small grains, hay, or pasture are only important on livestock farms. If adequate drainage is provided, corn and soybeans can frequently be grown.

Suitable drainage outlets are hard to locate, and tile do not function satisfactorily. In some areas crops are damaged by flooding during the growing season.

The following soil mapping units are in management group IIw-3: 136A and 207A.

Management Group IIw-4

This group consists of deep, nearly level, silty, somewhat poorly drained soils on uplands and terraces. They are members of the Kendall and Starks series. These soils have moderate to moderately slow permeability and moderate to high water-holding capacity. They are slightly acid to medium acid in reaction.

Soils in this group are suited to corn, soybeans, and small grain, and to grass and legumes grown for hay and pasture. Row crops can be grown intensively when there is adequate drainage and sound management.

Drainage is needed in some areas.

The following soil mapping units are in management group IIw-4: 132A and 242A.

Management Group IIIe

This group consists of deep, moderately sloping to strongly sloping, moderately well-drained to well-drained silty soils on uplands and terraces. These soils are members of the Camden, LaRose, Miami, and Parr series. They have moderate to moderately slow permeability and high available water capacity. They have medium to low natural fertility

and are slightly acid to strongly acid in reaction. Erosion is a severe hazard.

If management practices are intensive, the soils of this group are suited to cultivated crops, hay, and pasture.

Erosion control is the main problem. Grass and legumes should be grown frequently in the rotation. Contouring and terracing should be used to control erosion where practical. Where these practices are not used tillage should be kept to a minimum, and a cover of growing vegetation or mulch should be kept on the surface as much of the time as possible.

The following soil mapping units are in management group IIIe: 27D, 27D2, 60D2, 134D2, 221C3, 221D2.

Management Group IIIw-1

This group consists of deep, level to depressional soils on the uplands and terraces. Typically these soils have a surface layer and subsoil of heavy silty clay loam. They are members of the Peotone series. They have moderately slow permeability and high available water capacity.

Soils of this group are well suited for corn and soybeans. They are usually wetter than the surrounding soils, and very often crops will suffer from standing or ponding water.

Establishing an outlet for drainage is the most serious problem. Tile, tile with surface inlets, or open ditches are used.

The following soil mapping unit is in management group IIIw-1: 330A.

Management Group IIIw-2

This group consists of Houghton muck soils. They are deep, level, organic soils in depressional areas of the uplands. These soils receive water from runoff on surrounding soils and are subject to severe ponding. They have variable permeability and very high available water capacity.

They are somewhat low in natural fertility. Houghton soils are naturally neutral in reaction.

If artificially drained, these soils are well suited to corn, soybeans, and specialized crops. They are seldom used for small grain or hay. Undrained areas are used for pasture or left for wildlife habitat.

The main problems are control of ponding and maintenance of drainage systems and outlets. Over-drainage can result in a hazard of wind erosion or fire.

The following soil mapping unit is in management group IIIw-2: 103A.

Management Group VIe-1

This group consists of moderately steep to steep silty and loamy soils on the uplands and terraces. These soils are members of the Camden, Fox, Hennepin, and Miami series. They have moderate to rapid permeability. The available water capacity is high in the Hennepin and Miami series. Natural fertility is low. Erosion of areas unprotected by vegetation is severe.

These soils are suited to hay, pasture, trees, and other permanent vegetative cover.

Control of erosion is the main problem. Overgrazing of pastures should be prevented, and grazing of wooded areas should not be permitted.

The following soil mapping units are in management group VIe-1: 25F, 25F2, 27E2.

Crop Yields and Soil Productivity

Crop yields and soil productivity indexes for basic and high levels of management are given in Table 6 for each soil mapping unit in the Champaign-Urbana area.

The two levels of management (basic and high) are defined in University of Illinois Extension Circular 1016, "Productivity of Illinois Soils" (Odell and Oschwald, 1970), and briefly in the following paragraphs. Due to the wide range in management practices on farms, it is important that management levels be defined rather precisely in order that crop yield and other measures of soil productivity be meaningful.

The basic management level includes partial drainage for those soils needing drainage, with additional drainage being needed for optimum production. Soil reaction is maintained to a pH of 6.0 to 6.5. Available phosphorus (P-1) test levels are kept at values of 10 to 15. Available potassium levels are maintained at 125 to 150 on soils with low potassium-supplying power and at 200 or more on soils with medium to high potassium-supplying power. Nitrogen levels are those obtained by adding 50 to 75 pounds of nitrogen per year to the corn crop in a C-SB-W-M rotation. Crop residues are returned to the soil. Plant populations for corn are 12,000 to 14,000 per acre. Erosion control practices are not adequate to control soil losses within tolerances considered necessary to precent serious soil damage. Weed and insect control and tillage often lack timeliness.

Long-time average crop yields from the residue-limestone plots at the Illinois agronomy fields were used as the basis for yield estimates for such bench-mark soils as Sable, Muscatine, Flanagan, and Elliott.

The high management level is based on input levels thought to be required for maximum profit. This level is based on present technology and on recent yields obtained from high-input levels at the agronomy fields and research centers in Illinois. Specific management inputs include drainage improvement consistent with soil properties and economic considerations. Soil reaction is maintained to a pH of 6.0 to 6.5. Available phosphorus (P-1) test levels are maintained at 40 to 50. Available potassium test levels are kept at 240 or higher. Nitrogen application rates are 125 to 175 pounds per acre per year for corn. Corn plant populations are 20,000 to 24,000 per acre, adjusted downward for soils low in water-holding capacity. Erosion-control practices are such that the soil is not seriously damaged. Weed and insect control are adequate and timely. Tillage operations fit the soil and the crop, while avoiding excessive tillage. The best crop varieties are used. Harvesting is timely and efficient.

The yields shown in Table 6 for mapping units are calculated from the yields shown in Circular 1016, "Productivity of Illinois Soils," (Odell and Oschwald, 1970) using a separate adjustment percentage for each different slope and erosion class of all soils.

Table 6. — Crop Yield Estimates and Productivity Indexes for the Soils of the Champaign-Urbana Area

Soil map symbol	ESTIMATED CROP YIELDS PER ACRE							
	Corn		Soybeans		Wheat		Oats	
	Basic mgt.	High mgt.	Basic mgt.	High mgt.	Basic mgt.	High mgt.	Basic mgt.	High mgt.
	bu.	bu.	bu.	bu.	bu.	bu.	bu.	bu.
24B	67	105	22	36	24	45	43	61
24C	60	100	20	34	22	43	39	58
24C2	57	95	19	32	21	41	37	55
25F	-	-	-	-	10	21	21	34
25F2	-	-	-	-	9	20	20	32
27B	59	101	19	35	20	42	37	59
27C	56	96	18	33	19	40	35	56
27C2	53	91	17	31	18	38	33	53
27D	53	91	17	31	18	38	33	53
27D2	50	86	16	30	17	36	31	50
27E2	47	81	15	28	16	34	29	47
56B	76	124	24	41	26	52	55	77
56B2	72	118	23	39	24	49	52	73
56C	72	118	23	39	24	49	52	73
56C2	68	112	21	37	23	47	49	69
60C	64	97	19	34	20	41	41	61
60D2	57	87	17	30	18	37	36	55
67A	77	118	24	40	23	45	52	67
76A	77	120	27	40	27	42	56	60
103A	75	112	25	40	-	-	-	-
104A	83	129	27	41	27	52	58	76
105B	73	120	24	39	24	48	53	74
107A	85	125	30	41	29	46	55	67
132A	69	112	22	36	22	48	48	65
134A	64	106	20	35	21	45	43	64
134B	61	106	19	35	20	45	41	64
134C	58	101	18	33	19	43	39	61
134D2	51	90	16	30	17	38	34	54

Table 6. — Crop Yield Estimates and Productivity Indexes (Continued)

Soil map symbol	ESTIMATED CROP YIELDS PER ACRE				PRODUCTIVITY INDEXES FOR GRAIN CROPS	
	Alfalfa		Mixed Pasture			
	Basic mgt.	High mgt.	Basic mgt.	High mgt.	Basic mgt.	High mgt.
	tons	tons	days	days		
24B	2.8	4.4	139	221	72	121
24C	2.5	4.2	125	210	65	115
24C2	2.4	4.0	118	199	61	109
25F	1.3	2.3	67	114	33	66
25F2	1.2	2.2	64	108	31	63
27B	2.4	4.2	121	210	63	116
27C	2.3	4.0	115	200	60	110
27C2	2.2	3.8	108	189	57	104
27D	2.2	3.8	108	189	57	104
27D2	2.0	3.6	102	179	53	98
27E2	1.9	3.4	96	168	50	92
56B	2.9	5.0	147	250	86	140
56B2	2.8	4.8	140	238	81	133
56C	2.8	4.8	140	238	81	133
56C2	2.6	4.5	132	225	77	126
60C	2.6	4.0	130	200	70	110
60D2	2.3	3.6	116	179	62	98
67A	2.7	4.5	135	225	85	130
76A	3.0	4.2	150	210	90	130
103A	-	-	140	200	85	130
104A	3.2	5.1	160	255	90	145
105B	3.0	4.9	147	245	81	135
107A	3.4	4.9	125	245	95	140
132A	2.8	4.6	140	230	75	125
134A	2.7	4.5	135	225	70	120
134B	2.6	4.5	128	225	67	120
134C	2.4	4.3	122	214	63	114
134D2	2.2	3.8	108	191	56	102

Table 6. — Crop Yield Estimates and Productivity Indexes (Continued)

Soil map symbol	ESTIMATED CROP YIELDS PER ACRE							
	Corn		Soybeans		Wheat		Oats	
	Basic mgt.	High mgt.	Basic mgt.	High mgt.	Basic mgt.	High mgt.	Basic mgt.	High mgt.
	bu.	bu.	bu.	bu.	bu.	bu.	bu.	bu.
136A	56	94	18	32	19	38	35	53
145B	77	121	24	42	25	52	52	76
145C	73	115	23	40	23	49	50	72
145C2	69	109	21	38	22	47	47	68
148A	81	125	27	40	29	51	59	80
148B	77	125	26	40	28	51	56	80
148C	73	119	24	38	26	48	53	76
148C2	69	113	23	36	25	46	50	72
149A	88	139	31	43	31	54	60	83
149B	84	139	29	43	29	54	57	83
152A	89	134	32	46	30	53	57	75
154A	90	141	31	47	32	58	60	84
154B	86	141	29	47	30	58	57	84
171B	81	128	26	41	28	53	56	79
171C	77	122	24	39	26	50	53	75
198A	90	140	31	45	31	55	61	85
198B	86	140	29	45	29	55	58	85
199A	86	131	29	41	31	52	60	82
199B	82	131	28	41	29	52	57	82
207A	62	105	21	35	20	43	40	60
221B	80	107	22	40	23	38	52	69
221C	72	102	20	36	21	46	47	66
221C2	68	97	19	34	20	44	44	63
221C3	56	91	16	32	16	41	37	59
221D2	64	91	18	32	19	41	42	59
233A	66	107	21	37	23	48	46	64
233B	63	107	20	37	22	48	44	64
233B2	59	102	19	35	21	46	41	61
233C	59	102	19	35	21	46	41	61
233C2	56	96	18	33	20	43	39	58

Table 6. — Crop Yield Estimates and Productivity Indexes (Continued)

Soil map symbol	ESTIMATED CROP YIELDS PER ACRE				PRODUCTIVITY INDEXES FOR GRAIN CROPS	
	Alfalfa		Mixed Pasture			
	Basic mgt.	High mgt.	Basic mgt.	High mgt.	Basic mgt.	High mgt.
	tons	tons	days	days		
136A	1.8	3.4	90	170	60	105
145B	2.9	5.1	147	255	86	140
145C	2.8	4.8	140	242	81	133
145C2	2.6	4.6	132	230	77	126
148A	3.1	5.0	155	250	90	140
148B	2.9	5.0	147	250	86	140
148C	2.8	4.8	140	238	81	133
148C2	2.6	4.5	132	225	77	126
149A	3.5	5.4	175	270	100	150
149B	3.3	5.4	166	270	95	150
152A	3.4	5.0	170	250	100	150
154A	3.6	5.5	180	275	100	160
154B	3.4	5.5	171	275	95	160
171B	3.2	5.3	161	265	90	145
171C	3.1	5.0	153	252	86	138
198A	3.6	5.5	180	275	100	155
198B	3.4	5.5	171	275	95	155
199A	3.5	5.3	175	265	95	145
199B	3.3	5.3	166	265	90	145
207A	2.3	4.0	115	200	70	120
221B	3.0	4.6	150	232	83	126
221C	2.7	4.4	135	220	75	120
221C2	2.5	4.2	127	208	71	114
221C3	2.1	3.9	105	197	58	107
221D2	2.4	3.9	120	197	67	107
233A	2.7	4.5	135	225	75	125
233B	2.6	4.5	128	225	71	125
233B2	2.4	4.3	122	214	68	119
233C	2.4	4.3	122	214	68	119
233C2	2.3	4.1	115	203	64	113

Table 6. — Crop Yield Estimates and Productivity Indexes (Continued)

Soil map symbol	ESTIMATED CROP YIELDS PER ACRE							
	Corn		Soybeans		Wheat		Oats	
	Basic mgt.	High mgt.	Basic mgt.	High mgt.	Basic mgt.	High mgt.	Basic mgt.	High mgt.
	bu.	bu.	bu.	bu.	bu.	bu.	bu.	bu.
234A	83	128	27	41	28	54	56	76
234B	79	128	26	41	27	54	53	76
236A	73	116	23	38	25	49	50	68
236B	69	116	22	38	24	49	48	68
242A	73	117	23	37	24	48	51	68
242B	69	117	22	37	23	48	48	68
243A	67	110	21	35	23	46	47	66
243B	64	110	20	35	22	46	45	66
291B	63	110	19	37	21	48	42	65
322B	62	106	20	36	22	46	41	60
322B2	59	101	19	34	21	44	39	57
322C	59	101	19	34	21	44	39	57
322C2	56	96	18	32	19	42	37	54
330A	70	107	24	38	22	37	45	53
353B	70	123	24	40	26	51	48	73
385B	77	124	26	39	27	52	59	75
451A	86	130	30	42	31	52	57	73
481A	87	135	30	46	31	55	60	84
481B	83	135	29	46	29	55	57	84
496B	67	114	21	37	23	48	43	66

Table 6. — Crop Yield Estimates and Productivity Indexes (Concluded)

Soil map symbol	ESTIMATED CROP YIELDS PER ACRE				PRODUCTIVITY INDEXES FOR GRAIN CROPS	
	Alfalfa		Mixed Pasture			
	Basic mgt.	High mgt.	Basic mgt.	High mgt.	Basic mgt.	High mgt.
	tons	tons	days	days		
234A	3.2	5.1	160	255	90	140
234B	3.0	5.1	152	255	86	140
236A	2.9	4.7	145	235	80	130
236B	2.9	4.7	138	235	76	130
242A	2.9	4.7	145	235	80	130
242B	2.8	4.7	138	235	76	130
243A	2.7	4.5	135	225	75	120
243B	2.6	4.5	128	225	71	120
291B	2.4	4.4	119	220	67	125
322B	2.5	4.4	127	221	69	121
322B2	2.4	4.2	120	210	65	115
322C	2.4	4.2	120	210	65	115
322C2	2.3	4.0	113	199	61	109
330A	2.5	3.8	125	190	80	120
353B	2.9	4.9	143	245	81	135
385B	3.2	5.1	158	253	90	137
451A	3.5	5.1	175	255	95	145
481A	3.5	5.5	175	275	100	155
481B	3.3	5.5	166	275	95	155
496B	2.6	4.5	128	225	71	125

Estimated Physical and Chemical Properties of Champaign-Urbana Area Soils

In Table 7 the soil series of the survey area and their mapping symbols are listed and several soil properties likely to affect construction of roads and airports, for the support of buildings, erosion control, sewage disposal, and many other related uses. The depth at which bedrock occurs is not given, since in the Champaign-Urbana area, bedrock is so far below the surface that it does not present a problem for most uses.

The estimated physical and chemical properties are based on a limited number of tested samples. Soil materials are not always uniform and some of the soil mapping units include small areas of different soil materials. Because of this, the information given does not eliminate the need for on-site sampling and testing of soil materials for design and construction of specific engineering works and uses.

Following is an explanation of the columns in Table 7:

For Soil Texture Classification, three systems are commonly used: U.S.D.A. texture (U.S.D.A., 1951); Unified Classification System (Waterways Experiment Station, 1953); and the American Association of State Highway Officials (AASHO) (American Association of Highway Officials, 1961).

The U.S. Department of Agriculture system of classifying soils according to texture is primarily for agricultural use. In this system, soils are classified according to the proportional amount of different sizes of mineral particles. The determination is based on the material less than 2.0 millimeters in size. A soil that is at least 40 percent clay particles, for example, is called clay.

In the Unified Classification, the soils are grouped on the basis of their texture and plasticity and their performance as material for construction purposes. In the Unified system SW and SP are clean sands; SM and SC are sands with fines of silt and clay; ML and CL are silts and clays with low liquid limit, and MH and CH are silts and clays with high liquid limit.

In the AASHO system, soil materials are classified into seven principal groups, designated A-1 through A-7. The best material for use in highway subgrades (gravelly soils of high bearing capacity) are classified A-1, and the poorest (clayey soils having low strength when wet) are classified A-7.

The Percent Passing Sieve column is an indication of grain size distribution in soils. The estimated range in percentage of material passing sieves No. 4, 10, 40, and 200 reflects the normal range for a soil series. Most soils fall within the range given; however, due to grain size variability, some may fall outside the range.

Liquid Limit and Plastic Limit measure the effect of water on the consistence of soil material. As the moisture content of a clayey soil is increased from a very dry state, the material changes from a semi-solid to a plastic state. As the moisture content is further increased, the material changes from a plastic state to a liquid state. The plastic limit is the moisture content at which the soil material changes from a semisolid to a plastic state. The liquid limit is the moisture content at which the material changes from a plastic to a liquid state. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which a soil material is in a plastic condition.

Permeability is the capability of the soil to transmit water. The ratings given represent the "in place" permeability and are estimated by comparison, by layers, with soils of known permeability. Permeability is shown as the range in which each layer of the soil normally will fall.

Reaction refers to the pH value of the soil. The pH gives an indication of the corrosiveness of the soil solution and the protection needed for structures, such as concrete or pipelines, when placed in the soil.

Available water capacity is that amount of capillary water in the soil available for plant growth after all free water has drained away. It is given as inches of water per inch of soil for each layer and as the total to a depth of 5 feet.

Depth to seasonally high water table is the depth at which the soil is saturated with water. This does not apply where subsurface drainage systems are installed.

Frost action potential is the probably effects on structures resulting from the freezing of soil material and its subsequent thawing. This includes not only the heaving as the material freezes but also the excessive wetting and loss of soil strength during thaw. A rating is applied to the soil as a whole.

Shrink-swell potential indicates the volume change to be expected of the soil material with changes in moisture content.

Corrosion potential for concrete indicates the rate of deterioration of concrete when placed in the soil (Romanoff, 1957). The rate depends on the amount of sulfates, the texture, and the acidity.

Table 7. — Estimated Physical and Chemical Properties of Soils in the Champaign-Urbana Area

Soil series and map symbol	Depth from surface (inches)	Soil Texture Classification			Percent passing sieve				Liquid limit	Plasticity index	Permeability (inches per hour)	Reaction (pH)	Available water capacity		Depth to seasonally high water table (feet)	Frost action potential	Shrink-swell potential	Corrosion potential for concrete
		USDA	Unified	AASHO	No.4 (4.7mm.)	No.10 (2.0mm.)	No.40 (0.42mm.)	No.200 (0.074mm.)					In./in of soil	Inches in 5 feet				
Atlanta:(1) 385B	0-12 12-54 54-60	Silt loam Silty clay loam Loam	ML or CL CL ML or CL	A-4 or A-6 A-6 A-4 or A-6	100 95-100 95-100	100 95-100 85-95	95-100 95-100 75-90	95-100 95-100 60-80	30-40 30-45 30-45	10-25 10-25 10-20	0.6-2.0 0.6-2.0 0.2-1.0	5.1-6.5 4.5-6.0 7.4-8.4	.23 .19 .16	11.7	More than 5	Low	Low Moderate Low	- Moderate Low
Batavia: 105B	0-15 15-44 44-60	Silt loam Silty clay loam Clay loam,sandy loam,or loam	CL or ML CL CL,ML or SM	A-6 or A-4 A-6 A-2,A-4 or A-6	100 100 90-100	100 95-100 80-95	95-100 95-100 60-90	95-100 95-100 40-85	30-40 30-45 15-35	10-25 10-25 0-15	0.6-2.0 0.6-2.0 0.6-6.3	5.6-7.3 5.1-6.5 6.1-8.4	.21 .19 .15	10.1	More than 5	Low	Low Moderate Low	- Moderate Low
Birkbeck: 233A,233B,233B2 233C,233C2	0-12 12-42 42-60	Silt loam Silty clay loam Loam	ML or CL CL ML or CL	A-4 or A-6 A-6 A-4 or A-6	100 95-100 95-100	100 95-100 85-95	95-100 95-100 75-90	95-100 95-100 60-80	30-40 30-45 30-45	10-25 10-25 10-25	0.6-2.0 0.6-2.0 0.2-1.0	5.1-7.3 5.1-6.0 6.1-8.4	.21 .19 .16	11.1	More than 5	Low	Low Moderate Low	- Moderate Low
Brenton: 149A, 149B	0-14 14-43 43-60	Silt loam Silty clay loam and clay loam Loam,silt loam, or sandy loam	ML or CL CL SM,SC, or CL	A-4 A-6 A-2,A-4 or A-6	100 95-100 90-100	95-100 90-100 80-95	85-95 75-95 50-90	80-95 60-90 30-80	35-45 35-50 25-40	10-20 10-25 5-25	0.6-2.0 0.6-2.0 0.6-6.3	5.6-7.3 5.1-6.5 6.1-8.4	.23 .18 .14	10.8	1 - 3	Moderate	Low Moderate Low	- Moderate Low
Brooklyn: 136A	0-16 16-43 43-60	Silt loam Silty clay loam Clay loam,sandy clay loam or loam	CL CH ML or CL	A-6 or A-7 A-7 A-4 or A-6	100 100 95-100	100 95-100 80-100	95-100 90-100 75-90	90-100 85-100 30-80	30-50 30-45 20-45	10-25 15-30 5-25	0.2-0.6 0.06-0.2 0.6-6.3	5.1-6.5 5.1-6.0 5.6-7.8	.21 .17 .16	10.7	Less than 2	High	Low High Moderate	- Moderate Low
Camden: 134A, 134B, 134C, 134D2	0-12 12-42 42-60	Silt loam Silty clay loam and clay loam Loam,silt loam,or sandy loam	ML or CL CL SM,SC or CL	A-4 A-6 A-2,A-4 or A-6	100 95-100 90-100	95-100 90-100 80-95	85-95 75-95 50-90	80-95 60-90 30-80	25-35 25-45 25-45	10-20 5-20 5-15	0.6-2.0 0.6-2.0 0.6-6.3	5.6-6.5 5.1-6.5 5.6-7.8	.21 .18 .14	10.4	More than 5	Low	Low Moderate Low	- Moderate Low
Catlin: 171B, 171C	0-13 13-52 52-60	Silt loam Silty clay loam Loam	ML or CL CL ML or CL	A-4 or A-6 A-6 A-4 or A-6	100 95-100 95-100	100 95-100 85-95	95-100 95-100 75-90	95-100 95-100 60-80	30-40 30-45 30-45	10-25 10-25 10-25	0.6-2.0 0.6-2.0 0.2-1.0	5.6-6.5 5.1-6.5 5.6-8.4	.23 .19 .16	11.7	More than 5	Low	Low Moderate Low	- Moderate Low
Dana: 56B, 56B2, 56C, 56C2,	0-13 13-50 50-60	Silt loam Silty clay loam and clay loam Loam	ML or CL CL ML or CL	A-4 or A-6 A-6 or A-7 A-4 or A-6	100 95-100 95-100	95-100 90-100 85-95	90-100 80-95 75-90	90-100 70-95 60-80	30-45 30-50 30-45	10-20 10-30 10-25	0.6-2.0 0.6-2.0 0.2-1.0	5.6-6.5 5.1-6.5 6.6-8.4	.23 .18 .16	11.3	3 - 5	Moderate	Low Moderate Low	- Moderate Low
Dodge: 24B, 24C, 24C2	0-11 11-35 35-60	Silt loam Silty clay loam and clay loam Loam	ML or CL CL ML or CL	A-4 or A-6 A-6 or A-7 A-4 or A-6	100 95-100 95-100	95-100 90-100 85-95	90-100 80-95 75-90	90-100 70-95 60-80	35-45 35-50 30-40	10-25 15-30 10-20	0.6-2.0 0.6-2.0 0.2-1.0	5.6-7.3 5.1-6.5 7.4-8.4	.21 .18 .16	10.6	More than 5	Low	Low Moderate Low	- Moderate Low
Drummer: 152A	0-14 14-41 41-60	Silty clay loam Silty clay loam Silt loam,loam,or sandy loam	CL or OH CL SM,SC,CL or ML	A-7 A-7 or A-6 A-2,A-4 or A-6	95-100 95-100 90-100	95-100 95-100 80-100	90-100 90-100 50-90	85-100 85-100 30-75	30-55 25-55 20-40	15-30 15-35 5-15	0.6-2.0 0.6-2.0 0.6-2.0	5.6-7.3 6.1-7.3 6.6-7.8	.22 .20 .14	11.1	Less than 2	High	Moderate Moderate Low	- Moderate Low
Elburn: 198A, 198B	0-14 14-54 54-60	Silt loam Silty clay loam Silt loam,loam, or sandy loam	CL or ML CL ML or SM	A-6 or A-4 A-6 A-2 or A-4	100 100 90-100	100 95-100 80-95	95-100 95-100 60-90	95-100 95-100 40-85	30-40 30-45 15-30	10-25 10-25 0-15	0.6-2.0 0.6-2.0 0.6-6.3	5.6-7.3 5.6-7.3 6.1-8.4	.23 .19 .15	11.7	1 - 3	Moderate	Low Moderate Low	- Moderate Low
Fincastle: 196B	0-12 12-45 45-60	Silt loam Silty clay loam and clay loam Loam	ML or CL CL ML or CL	A-4 or A-6 A-6 A-4 or A-6	100 95-100 95-100	100 95-100 85-95	95-100 80-95 75-90	90-100 70-95 60-80	30-45 30-50 30-45	10-20 10-30 10-20	0.6-2.0 0.2-2.0 0.2-1.0	5.6-6.5 5.1-7.3 7.4-8.4	.21 .18 .16	10.9	1 - 3	Moderate	Low Moderate Low	- Moderate Low
Flanagan: 154A, 154B	0-18 18-45 45-60	Silt loam Silty clay loam Loam	ML or CL CL ML or CL	A-4 or A-6 A-6 A-4 or A-6	100 95-100 95-100	100 95-100 85-95	95-100 95-100 75-90	95-100 95-100 60-80	30-50 35-50 25-45	15-25 15-30 10-25	0.6-2.0 0.6-2.0 0.2-1.0	5.6-6.5 5.1-6.5 7.4-8.4	.23 .19 .16	11.7	1 - 3	Moderate	Low Moderate Low	- Moderate Low
Harpster: 67A	0-13 13-37 37-60	Silty clay loam Silty clay loam Sandy loam, loam or silt loam	CL or OH CL SM,SC,ML or CL	A-7 A-6 or A-7 A-2,A-4 or A-6	100 95-100 90-100	95-100 90-100 80-100	90-100 85-100 70-95	90-100 80-100 60-90	30-55 30-45 20-35	15-30 10-25 5-20	0.6-2.0 0.6-2.0 0.6-2.0	7.4-8.4 7.4-8.4 7.4-8.4	.21 .18 .15	10.5	Less than 2	High	Moderate Moderate Low	- Low Low
Hennepin: 25F, 25F2	0-15 15-60	Loam Loam	ML or CL ML or CL	A-4 or A-6 A-4 or A-6	95-100 95-100	90-100 85-95	80-95 75-90	70-90 60-80	30-45 30-45	10-20 10-20	0.6-2.0 0.2-1.0	6.6-7.3 7.4-8.4	.17 .16	9.8	More than 5	Low	Low Low	- Low
Houghton 103A	0-60	Muck	Pt	A-8	-	-	-	-	NP	NP	2.0-6.3	6.1-7.8	.30	18.0	Less than 1	High	Low	Low

Table 7. — Estimated Physical and Chemical Properties of Soils in the Champaign-Urbana Area (Continued)

Soil series and map symbol	Depth from surface (inches)	Soil Texture Classification			Percent passing sieve				Liquid limit	Plasticity index	Permeability (inches per hour)	Reaction (pH)	Available water capacity		Depth to seasonally high water table (feet)	Frost action potential	Shrink-swell potential	Corrosion potential for concrete
		USDA	Unified	AASHO	No.4 (4.7mm.)	No.10 (2.0mm.)	No.40 (0.42mm.)	No.200 (0.074mm.)					In./in of soil	Inches in 5 feet				
Kendall: 2A2A, 2A2B	0-11 11-52 52-60	Silt loam Silty clay loam Loam,silt loam,or sandy loam	ML or CL CL ML or SM	A-4 or A-6 A-6 A-2 or A-4	100 100 90-100	100 95-100 80-95	95-100 95-100 60-90	95-100 95-100 40-85	30-40 30-45 15-30	10-25 10-25 0-15	0.6-2.0 0.6-2.0 0.6-6.3	6.1-7.3 5.1-6.5 6.6-8.4	.21 .19 .16	11.4	1 - 3	Moderate	Low Moderate Low	- Moderate Low
LaRose: 60C, 60D2	0-10 10-20 20-60	Silt loam Silty clay loam and clay loam Loam	ML or CL CL ML or CL	A-6 or A-4 A-6 or A-7 A-4 or A-6	100 95-100 95-100	95-100 90-100 85-95	90-100 75-95 75-90	85-100 60-90 60-80	30-40 30-45 30-40	10-20 10-25 10-20	0.6-2.0 0.6-2.0 0.2-1.0	6.1-7.3 5.6-7.3 7.4-8.4	.23 .18 .16	10.5	More than 5	Low	Low Moderate Low	- Moderate Low
Lawson: 451A	0-30 30-60	Silt loam Silt loam,loam,or sandy loam	CL or ML ML or SM	A-6 or A-4 A-4 or A-2	100 90-100	100 80-95	95-100 60-90	95-100 40-85	25-35 20-35	5-15 5-15	0.6-2.0 0.6-6.3	6.1-7.8 6.6-7.8	.23 .12	10.5	1 - 3	High	Low Low	Low Low
Miami: 27B,27C,27C2 27D,27D2,27E2	0-12 12-35 35-60	Silt loam Clay loam Loam	ML or CL CL ML or CL	A-4 or A-6 A-6 or A-7 A-4 or A-6	100 95-100 95-100	95-100 90-100 85-95	90-100 75-95 75-90	85-95 65-85 60-80	30-40 30-50 30-45	10-20 10-30 10-20	0.6-2.0 0.6-2.0 0.2-1.0	5.6-6.5 5.6-7.3 7.4-8.4	.21 .18 .16	10.7	More than 5	Low	Low Moderate Low	- Moderate Low
Otter: 76A	0-30 30-60	Silt loam Silt loam,loam,or sandy loam	CL or ML ML or SM	A-6 or A-4 A-4 or A-2	100 90-100	100 80-95	95-100 60-90	95-100 40-85	25-35 20-30	5-15 5-15	0.6-2.0 0.6-6.3	6.6-7.8 6.6-7.8	.23 .12	10.5	Less than 2	High	Low Low	Low Low
Parr: 221B,221C,221C2, 221C3,221D2	0-7 7-39 39-60	Silt loam Clay loam and silty clay loam Loam	ML or CL CL ML or CL	A-4 or A-6 A-6 or A-7 A-4 or A-6	100 95-100 95-100	95-100 90-100 85-95	90-100 75-95 75-90	85-95 65-90 60-80	30-45 30-50 30-45	10-20 10-30 10-20	0.6-2.0 0.6-2.0 0.2-1.0	5.6-6.5 5.6-7.3 7.4-8.4	.22 .18 .16	10.7	More than 5	Low	Low Moderate Low	- Moderate Low
Peotone: 330A	0-24 24-38 38-60	Silty clay loam Silty clay loam Silty clay loam and clay loam	CL or OH CL or CH CL	A-7 A-7 A-7 or A-6	95-100 95-100 95-100	90-100 90-100 90-100	85-100 90-100 75-95	85-100 85-100 60-95	45-65 35-75 30-70	15-25 15-40 15-50	0.6-2.0 0.2-0.6 0.2-0.6	5.6-7.3 6.6-7.8 7.4-8.4	.22 .20 .20	12.5	Less than 1	High	Moderate Moderate Moderate	- Low Low
Plano: 199A, 199B	0-21 21-48 48-60	Silt loam Silty clay loam Loam,silt loam,or sandy loam	CL or ML CL ML or SM	A-6 or A-4 A-6 A-4 or A-2	100 100 90-100	100 90-100 80-95	95-100 95-100 60-90	95-100 95-100 40-85	35-45 35-50 20-40	10-20 10-25 0-15	0.6-2.0 0.6-2.0 0.6-6.3	5.6-7.3 5.1-6.5 5.6-7.3	.23 .20 .12	11.7	More than 5	Low	Low Moderate Low	- Moderate Moderate
Proctor: 148A, 148B, 148C, 148C2	0-14 14-44 44-60	Silt loam Silty clay loam and clay loam Loam,silt loam,or sandy loam	ML or CL CL SM,SC, or CL	A-4 A-6 A-2,A-4, or A-6	100 95-100 90-100	95-100 90-100 80-95	85-95 75-95 50-90	80-95 60-90 30-80	30-45 30-45 25-45	10-20 10-20 0-15	0.6-2.0 0.6-2.0 0.6-6.3	5.6-6.5 5.1-6.5 6.6-8.4	.23 .18 .14	10.9	More than 5	Low	Low Moderate Low	- Moderate Low
Raub: 481A, 481B	0-14 14-45 45-60	Silt loam Silty clay loam and clay loam Loam	ML or CL CL ML or CL	A-4 or A-6 A-6 A-4 or A-6	100 95-100 95-100	100 95-100 85-95	95-100 80-95 75-90	90-100 70-95 60-80	30-45 30-50 30-45	10-20 10-30 10-20	0.6-2.0 0.2-2.0 0.2-1.0	5.6-7.3 5.1-7.3 7.4-8.4	.23 .18 .16	11.2	1 - 3	Moderate	Low Moderate Low	- Moderate Low
Russell: 322B, 322B2, 322C, 322C2	0-11 11-45 45-60	Silt loam Silty clay loam and clay loam Loam	ML or CL CL ML or CL	A-4 or A-6 A-6 A-4 or A-6	100 95-100 95-100	95-100 90-100 85-95	90-100 80-95 75-90	90-100 70-95 60-80	35-50 35-50 30-45	15-25 10-30 10-20	0.6-2.0 0.6-2.0 0.2-1.0	5.6-7.3 4.5-6.5 7.4-8.4	.21 .18 .16	10.8	More than 5	Low	Low Moderate Low	- Moderate Low
Sabina: 236A, 236B	0-13 13-50 50-60	Silt loam Silty clay loam Loam	ML or CL CL ML or CL	A-6 A-7 or A-6 A-4 or A-6	100 100 95-100	100 95-100 85-95	95-100 95-100 75-90	95-100 95-100 60-80	30-40 35-50 30-45	10-20 10-30 10-25	0.6-2.0 0.2-2.0 0.2-1.0	5.6-6.5 5.1-7.3 7.4-8.4	.21 .19 .16	11.4	1 - 3	Moderate	Low Moderate Low	- Moderate Low
St.Charles: 243A, 243B	0-12 12-42 42-60	Silt loam Silty clay loam Loam,silt loam, or sandy loam	CL or ML CL ML or SM	A-6 or A-4 A-6 A-2 or A-4	100 100 90-100	100 95-100 80-95	95-100 95-100 60-90	95-100 95-100 40-85	25-35 30-45 20-35	10-20 10-25 0-15	0.6-2.0 0.6-2.0 0.6-6.3	5.6-7.3 5.1-6.6 6.1-7.8	.21 .19 .12	10.4	More than 5	Low	Low Moderate Low	- Moderate Low
Sawmill: 107A	0-32 32-60	Silty clay loam Silty clay loam	CL,CH, or OH CL	A-7 A-7 or A-6	100 95-100	95-100 90-100	90-100 85-100	90-100 80-100	35-50 35-50	15-30 10-30	0.2-2.0 0.2-2.0	6.1-7.3 6.1-7.3	.21 .20	12.3	Less than 2	High	Moderate Moderate	Low Low
Saybrook: 145B, 145C, 145C2	0-13 13-32 32-60	Silt loam Silty clay loam and clay loam Loam	ML or CL CL ML or CL	A-4 or A-6 A-6 or A-7 A-4 or A-6	100 95-100 95-100	95-100 90-100 85-95	90-100 80-95 75-90	90-100 70-95 60-80	35-55 30-50 30-45	10-25 10-30 10-25	0.6-2.0 0.6-2.0 0.2-1.0	6.1-7.3 5.1-6.5 7.4-8.4	.23 .18 .16	10.9	More than 5	Low	Low Moderate Low	- Moderate Low
Starks: 132A	0-11 11-50 50-60	Silt loam Silty clay loam and clay loam Loam,silt loam,or sandy loam	CL or ML CL SM,SC,or CL	A-6 or A-4 A-6 or A-7 A-2,A-4 or A-6	100 95-100 90-100	95-100 90-100 80-95	85-95 75-95 50-90	80-95 60-90 30-80	30-40 30-45 25-40	10-20 10-25 0-15	0.6-2.0 0.2-2.0 0.6-6.3	5.6-6.5 5.1-6.0 5.6-8.4	.21 .19 .14	11.1	1 - 3	Moderate	Low Moderate Low	- Moderate Low
Sunbury: 234A,234B	0-11 11-43 43-60	Silt loam Silty clay loam Loam	ML or CL CL ML or CL	A-6 A-7 or A-6 A-4 or A-6	100 100 95-100	100 95-100 85-95	95-100 95-100 75-90	95-100 95-100 60-80	30-40 35-50 30-45	10-20 10-30 10-25	0.6-2.0 0.2-2.0 0.2-1.0	5.6-7.3 5.6-6.5 6.6-8.4	.23 .19 .16	11.3	1 - 3	Moderate	Low Moderate Low	- Moderate Low

Table 7. — Estimated Physical and Chemical Properties of Soils in the Champaign-Urbana Area (Concluded)

Soil series and map symbol	Depth from surface (inches)	Soil texture classification			Percent passing sieve				Liquid limit	Plasticity index	Permeability (inches per hour)	Reaction (pH)	Available water capacity		Deptn to seasonally high water table (feet)	Frost action potential	Shrink-swell potential	Corrosion potential for concrete
		USDA	Unified	AASHO	No.4 (4.7mm.)	No.10 (2.0mm.)	No.40 (0.42mm.)	No.200 (0.074mm.)					In./in of soil	Inches in 5 feet				
Toronto: 353B	0-16 16-45 45-60	Silt loam Silty clay loam and clay loam Loam	ML or CL CL ML or CL	A-4 or A-6 A-6 A-4 or A-6	100 95-100 95-100	95-100 90-100 85-95	95-100 80-95 75-90	90-100 70-95 60-80	35-50 35-50 30-45	15-25 10-30 10-20	0.6-2.0 0.2-2.0 0.2-1.0	5.6-6.5 5.1-6.5 7.4-8.4	.23 .18 .16	11.3	1 - 3	Moderate	Low Moderate Low	- Moderate Low
Virgil: 104A	0-14 14-49 49-60	Silt loam Silty clay loam Silt loam, loam or sandy loam	ML or CL CL ML or SM	A-4 or A-6 A-6 A-2 or A-4	100 100 90-100	100 95-100 80-95	95-100 95-100 55-90	95-100 95-100 40-85	20-45 30-40 15-30	5-20 10-20 0-15	0.6-2.0 0.6-2.0 0.6-6.3	5.6-7.3 5.1-6.5 6.6-8.4	.23 .19 .16	11.6	1 - 3	Moderate	Low Moderate Low	- Moderate Low
Ward: 207A	0-12 12-58 58-60	Silt loam Silty clay loam and clay loam Loam	CL CH ML or CL	A-6 or A-7 A-7 A-4 or A-6	100 100 95-100	100 95-100 85-95	95-100 90-100 75-90	90-100 85-100 60-80	30-50 30-45 20-45	10-25 15-30 5-25	0.2-0.6 0.06-0.2 0.2-1.0	4.5-6.0 5.1-6.5 6.6-8.4	.23 .17 .16	10.9	Less than 2	High	Low Moderate Low	- Moderate Low
Xenia: 291B	0-10 10-57 57-60	Silt loam Silty clay loam and clay loam Loam	ML or CL CL ML or CL	A-4 or A-6 A-6 or A-7 A-4 or A-6	100 95-100 95-100	95-100 90-100 85-95	90-100 80-95 75-90	90-100 70-95 60-80	35-50 35-50 30-45	15-25 10-30 10-20	0.6-2.0 0.6-2.0 0.2-1.0	5.6-7.3 5.1-6.5 6.6-8.4	.23 .18 .16	11.2	3 - 5	Moderate	Low Moderate Low	- Moderate Low

(1) Atlanta is an uncorrelated series as of the date of this survey.

Engineering Soil Interpretations for Agriculture

Table 8 gives the degree of limitation and soil features for certain uses that affect the design and application of engineering structures.

Following are explanations of columns in Table 8.

Drainage is affected by such soil properties as permeability, texture, and structure: depth to the water table and susceptibility to stream overflow.

Grassed waterways are affected by those features of the soil that affect the establishment, growth, and maintenance of vegetative cover and factors that hinder layout and construction. Some features are steepness of slope, permeability, and depth to water table.

Terraces and diversions are embankments or ridges constructed across the slope to intercept runoff so it soaks into the soil or flows slowly to a prepared outlet. Some features that affect suitability are steepness of slope, permeability, and resistance to erosion.

Irrigation of the soil is affected by such features as slope, water erosion, soil texture, rate of water intake of the soil and depth to water table.

Pond water storage areas hold water behind a dam or embankment. Soils suitable for water storage areas have low seepage which is related to their permeability.

Dams and embankments require soil material resistant to seepage and piping and of favorable stability, shrink-swell potential, and compactibility.

Table 8. — Engineering Soil Interpretations for Agriculture in the Champaign-Urbana Area (Degree of Limitation and Soil Features Affecting Use)

Soil series and mapping symbol	Drainage	Grassed waterways	Terraces and diversions	Irrigation	Ponds	
					Water storage areas	Dams and embankments
Atlanta:(1) 385B	SLIGHT: Natural drainage is adequate.	SLIGHT: Features generally favorable.	MODERATE: Exposed subsoil is somewhat clayey and difficult to vegetate.	MODERATE: Moderate intake rate subject to runoff and erosion, moderate permeability.	SLIGHT: Features are generally favorable.	SLIGHT in subsoil: MODERATE in underlying material - fair stability; compaction and resistance to piping.
Batavia: 105B	SLIGHT: Natural drainage is adequate.	SLIGHT: Features generally favorable.	MODERATE: Exposed subsoil is somewhat clayey and difficult to vegetate.	MODERATE: Moderate intake rate; moderate permeability.	SEVERE: Danger of excessive seepage through underlying material; some areas too porous to hold water.	SLIGHT in subsoil: MODERATE in underlying material - fair stability and compaction; poor resistance to piping.
Birkbeck: 233A,233B,233B2, 233C, 233C2	SLIGHT: Natural drainage is adequate.	SLIGHT on 0 to 4 percent slopes. MODERATE on 4 to 7 percent slopes; exposed subsoil subject to erosion.	MODERATE: Exposed subsoil is somewhat clayey and low in organic matter.	MODERATE: Moderate intake rate; moderate permeability; subject to runoff and erosion in most places.	SLIGHT: Features are generally favorable.	SLIGHT in subsoil; MODERATE in underlying material - fair stability, compaction, and resistance to piping.
Brenton: 149A, 149B	MODERATE: Seasonally high water table, moderate permeability.	MODERATE: Drainage often needed to prevent soft seepy areas; exposed subsoil somewhat difficult to vegetate.	MODERATE: Drainage often needed to prevent soft, seepy spots; exposed subsoil somewhat difficult to vegetate.	MODERATE: Moderate intake rate, drainage needed in places, high moisture retention values.	SEVERE: Hazard of excessive seepage through underlying stratified material.	SLIGHT in subsoil; MODERATE in underlying material-fair compaction and stability; poor resistance to piping.
Brooklyn: 136A	SEVERE: high water table, slow permeability, surface water ponds in places.	Not applicable.	Not applicable.	SEVERE: Slow intake rate, slow permeability.	SLIGHT: Features are generally favorable.	MODERATE: Fair stability and compaction; poor workability; good resistance to piping.
Camden: 134A,134B,134C, 134C2	SLIGHT: Natural drainage is adequate.	SLIGHT on 0 to 4 percent slopes; MODERATE on 4 to 7 percent slopes. Exposed subsoil subject to erosion.	MODERATE: Exposed subsoil is somewhat clayey and low in organic matter.	MODERATE: Moderate intake rate, moderate permeability; subject to runoff and erosion. in most places.	SEVERE: Danger of excessive seepage through underlying material; some areas too porous to hold water.	SLIGHT in subsoil; MODERATE in underlying material - fair stability and compaction; poor resistance to piping.
Catlin: 171B, 171C2	SLIGHT: Natural drainage is adequate.	SLIGHT on 2 to 4 percent slopes. MODERATE on 4 to 7 percent slopes; Exposed subsoil subject to erosion.	MODERATE: Exposed subsoil is somewhat clayey and low in organic matter.	MODERATE: Moderate intake rate, subject to runoff and erosion; moderate permeability.	SLIGHT: Features are generally favorable.	SLIGHT in subsoil; MODERATE in underlying material - fair stability, compaction, and resistance to piping.
Dana: 56B, 56B2, 56C, 56C2	SLIGHT: Natural drainage is adequate.	SLIGHT on 2 to 4 percent slopes; MODERATE on 4 to 7 percent slopes; exposed subsoil subject to erosion.	MODERATE: Exposed subsoil is somewhat clayey and low in organic matter.	MODERATE: Moderate intake rate and permeability; subject to runoff and erosion.	SLIGHT: Features are generally favorable.	SLIGHT in subsoil; MODERATE in underlying material--fair compaction , stability and resistance to piping.
Dodge: 24B, 24C, 24C2	SLIGHT: Natural drainage is adequate.	SLIGHT on 2 to 4 percent slopes; MODERATE on 4 to 7 percent slopes; exposed subsoil subject to erosion.	MODERATE: Exposed subsoil is somewhat clayey and low in organic matter.	MODERATE: Moderate intake rate and permeability; subject to erosion and runoff.	SLIGHT: Features are generally favorable.	SLIGHT in subsoil: MODERATE in underlying material - fair compaction stability, and resistance to piping.
Drummer: 152A	SEVERE: Normally high water table; moderately permeable; tile function well.	Not applicable.	Not applicable.	MODERATE: Needs drainage prior to irrigation; moderate intake rate and permeability.	SLIGHT to MODERATE: Moderately permeable; has high water table and potential for dugout ponds.	SLIGHT in subsoil: Good to fair stability and compaction in subsoil; low permeability; variable underlying material.
Elburn: 198A, 198B	MODERATE: Seasonally high water table; moderate permeability.	MODERATE: Exposed subsoil somewhat difficult to vegetate; drainage often needed for soft, seepy spots.	MODERATE: Seldom needed; exposed subsoil somewhat difficult to vegetate.	MODERATE: Moderate intake rate and permeability; drainage needed in places.	SEVERE: Danger of excessive seepage through underlying material.	SLIGHT in subsoil; MODERATE in underlying material - fair stability and compaction; poor resistance to piping.
Fincastle: 496B	MODERATE: Moderately or moderately slow permeability; seasonally high water table.	MODERATE: Exposed subsoil somewhat difficult to vegetate; drainage often needed for soft, seepy spots.	MODERATE: Seldom needed; exposed subsoil somewhat difficult to vegetate.	MODERATE: Moderate intake rate; drainage needed in some places.	SLIGHT: Features generally favorable.	SLIGHT in subsoil; MODERATE in underlying material - fair compaction; fair to good workability.
Flanagan; 154A, 154B	MODERATE: Moderate permeability; seasonally high water table.	MODERATE: Exposed subsoil somewhat difficult to vegetate; somewhat poorly drained.	MODERATE: Seldom needed; exposed subsoil somewhat difficult to vegetate.	MODERATE: Moderate intake rate and permeability; drainage needed in places.	SLIGHT: Features generally favorable.	SLIGHT in subsoil; MODERATE in underlying material - fair compaction and workability.
Harpster: 67A	SEVERE: Normally high water table; moderately permeable; tile function well.	Not applicable.	Not applicable.	MODERATE: Needs drainage prior to irrigation; moderate intake rate and permeability.	SLIGHT to MODERATE: Has high water table and potential for dugout ponds; moderately permeable.	SLIGHT in subsoil: Good to fair stability and compaction; low permeability. Variable underlying material.

Table 8. — Engineering Soil Interpretations for Agriculture in the Champaign-Urbana Area (Degree of Limitation and Soil Features Affecting Use) (Continued)

Soil series and mapping symbol	Drainage	Grassed waterways	Terraces and diversions	Irrigation	Ponds	
					Water storage areas	Dams and embankments
Hennepin: 25F, 25F2	SLIGHT: Natural drainage is adequate.	SEVERE: Subject to severe erosion; difficult to build and vegetate; steep slopes.	SEVERE: Short, steep slopes; difficult to vegetate; subject to severe erosion.	SEVERE: Generally not applicable due to slope.	MODERATE: Slopes restrict storage potential.	MODERATE in underlying material; fair to Poor compaction; fair to good workability.
Houghton: 103A	SEVERE: Normally high water table; moderately rapid permeability.	Not applicable.	Not applicable.	SEVERE: Very rapid intake rate; moderately rapid permeability; drainage needed before irrigation.	SEVERE: Not suited for embankment material; potential for dugout ponds.	SEVERE: not suitable - unstable organic material.
Kendall: 242A, 242B	MODERATE: Seasonally high water table; moderately permeable.	MODERATE: Exposed subsoil somewhat difficult to vegetate; drainage often needed for soft spots.	MODERATE: Seldom needed; exposed subsoil somewhat difficult to vegetate.	MODERATE: Moderate intake rate and permeability; drainage needed in places.	SEVERE: Danger of excessive seepage through underlying material.	SLIGHT in subsoil; MODERATE in underlying material - fair compaction and workability.
LaRose: 60C, 60D2	SLIGHT: Natural drainage is adequate.	MODERATE: Exposed subsoil subject to erosion and difficult to vegetate.	MODERATE: Exposed subsoil is somewhat clayey and low in organic matter.	MODERATE: Moderate intake rate and permeability; subject to erosion and runoff.	SLIGHT: Features generally favorable.	SLIGHT in subsoil; MODERATE in underlying material - fair stability, compaction, and workability.
Lawson: 451A	MODERATE: Seasonally high water table; moderately permeable; subject to flooding.	Not applicable.	Not applicable.	MODERATE: Moderate intake rate and permeability.	MODERATE: Subject to flooding; hazard of seepage; potential for dugout ponds.	SEVERE: Poor stability, compaction, and resistance to piping; high organic matter content.
Miami: 27B, 27C, 27C2 27D, 27D2, 27E2	SLIGHT: Natural drainage is adequate.	MODERATE on 2 to 12 percent slopes; SEVERE on 12 to 18 percent slopes. Exposed subsoil subject to erosion.	MODERATE on 2 to 12 percent slopes. SEVERE on 12 to 18 percent slopes; Exposed subsoil subject to erosion.	MODERATE on 2 to 12 percent slopes; SEVERE on 12 to 18 percent slopes; Erosion and runoff hazard.	SLIGHT on 2 to 12 percent slopes; MODERATE on 12 to 18 percent slopes; slopes restrict storage potential.	SLIGHT in subsoil; MODERATE in underlying material - fair stability, compaction, and workability.
Otter: 76A	SEVERE: Normally high water table; subject to flooding; moderately permeable.	Not applicable.	Not applicable.	MODERATE: Needs drainage prior to irrigation; moderate intake rate and permeability.	MODERATE: Subject to flooding; hazard of seepage; potential for dugout ponds.	SEVERE: Poor stability, compaction, and resistance to piping; high organic matter content.
Parr: 221B, 221C, 221C2, 221C3, 221D2	SLIGHT: Natural drainage is adequate.	SLIGHT on 2 to 4 percent slopes; MODERATE on 4 to 12 percent slopes. Exposed subsoil subject to erosion.	MODERATE: Exposed subsoil is somewhat clayey and low in organic matter.	MODERATE: Moderate intake rate and permeability; subject to erosion and runoff.	SLIGHT: Features are generally favorable.	SLIGHT in subsoil; MODERATE in underlying material - fair stability, compaction, and workability.
Peotone: 330A	SEVERE: Normally high water table; moderately slowly permeable.	Not applicable.	Not applicable.	MODERATE: Moderate intake rate; moderately slowly permeable; needs drainage prior to irrigation.	SLIGHT: Normally high water table; high potential for dugout ponds.	MODERATE: Fair to poor resistance, stability, and compaction.
Plano: 199A, 199B	SLIGHT: Natural drainage is adequate.	SLIGHT: Features are generally favorable.	MODERATE: Exposed subsoil is somewhat clayey and somewhat difficult to vegetate.	MODERATE: Moderate intake rate and permeability.	SEVERE: Danger of excessive seepage through underlying material.	SLIGHT in subsoil; MODERATE in underlying material; fair stability and compaction.
Proctor: 148A, 148B, 148C, 148C2	SLIGHT: Natural drainage is adequate.	SLIGHT on 0 to 4 percent slopes; MODERATE on 4 to 7 percent slopes. Exposed subsoil subject to erosion.	MODERATE: Exposed subsoil is somewhat clayey and somewhat difficult to vegetate.	MODERATE: Moderate intake rate and permeability.	SEVERE: Danger of excessive seepage through underlying material.	SLIGHT in subsoil; MODERATE in underlying material; fair stability, compaction, and workability.
Raub: 481A, 481B	MODERATE: Seasonally high water table; moderately to moderately slowly permeable.	MODERATE: Drainage often needed to prevent seepy spots; exposed subsoil somewhat difficult to vegetate.	MODERATE: Exposed subsoil somewhat clayey and difficult to vegetate.	MODERATE: Moderate intake rate; moderately slow to moderate permeability.	SLIGHT: Features generally favorable.	SLIGHT in subsoil; MODERATE in underlying material; fair stability, compaction, and workability.
Russell: 322B, 322B2, 322C, 322C2	SLIGHT: Natural drainage is adequate.	SLIGHT on 2 to 4 percent slopes; MODERATE on 4 to 7 percent slopes. Exposed subsoil subject to erosion.	MODERATE: Exposed subsoil is somewhat clayey and difficult to vegetate.	MODERATE: Moderate intake rate and permeability ; subject to runoff and erosion.	SLIGHT: Features generally favorable.	SLIGHT in subsoil; MODERATE in underlying material, fair stability, compaction, and workability.
Sabina: 236A, 236B	MODERATE: Seasonally high water table; moderately to moderately slowly permeable.	MODERATE: Drainage often needed to prevent seepy spots; exposed subsoil somewhat difficult to vegetate.	MODERATE: Exposed subsoil somewhat clayey and difficult to vegetate.	MODERATE: Moderate intake rate; moderate or moderately slow permeability.	SLIGHT: Features generally favorable.	SLIGHT in subsoil; MODERATE in underlying material, fair stability, compaction, and workability.

Table 8. — Engineering Soil Interpretations for Agriculture in the Champaign-Urbana Area (Degree of Limitation and Soil Features Affecting Use) (Concluded)

Soil series and mapping symbol	Drainage	Grassed waterways	Terraces and diversions	Irrigation	Ponds	
					Water storage areas	Dams and embankments
St.Charles: 243A, 243B	SLIGHT: Natural drainage is adequate.	SLIGHT: Features generally favorable.	MODERATE: Exposed subsoil somewhat clayey and difficult to vegetate.	MODERATE: Moderate intake rate and permeability.	SEVERE: Danger of excessive seepage through underlying material.	SLIGHT in subsoil: MODERATE in underlying material - fair stability, compaction,and workability.
Sawmill: 107A	SEVERE: Normally high water table; moderately to moderately slowly permeable.	Not applicable.	Not applicable.	SEVERE: Needs drainage and flood protection; moderate to moderately slow permeability.	MODERATE: Subject to flooding; high organic matter content.	MODERATE: Fair compaction, stability, high compressibility; high organic matter content.
Saybrook: 145B, 145C, 145C2	SLIGHT: Natural drainage is adequate.	SLIGHT on 2 to 4 percent slopes; MODERATE on 4 to 7 percent slopes. Exposed subsoil subject to erosion.	MODERATE: Exposed subsoil somewhat clayey and difficult to vegetate.	MODERATE: Moderate intake rate and permeability; subject to runoff and erosion.	SLIGHT: Features are generally favorable.	SLIGHT in subsoil; MODERATE in underlying material - fair stability, compaction,and workability.
Starks: 132A	MODERATE: Seasonally high water table; moderately to moderately slowly permeable.	MODERATE: Exposed subsoil somewhat difficult to vegetate; drainage often needed for seepy spots.	MODERATE: Exposed subsoil somewhat clayey and difficult to vegetate; seldom needed.	MODERATE: Moderate intake rate; moderate to moderately slowly permeable.	SEVERE: Hazard of seepage through underlying material.	SLIGHT in subsoil; MODERATE in underlying material - fair stability, compaction, and resistance to piping.
Sunbury: 234A, 234B	MODERATE: Seasonally high water table; moderately to moderately slowly permeable.	MODERATE: Drainage often needed for seepy spots; exposed subsoil somewhat difficult to vegetate.	MODERATE: Exposed subsoil somewhat clayey and difficult to vegetate.	MODERATE: Moderate intake rate; moderate to moderately slow permeability.	SLIGHT: Features are generally favorable.	SLIGHT in subsoil; MODERATE in underlying material - fair stability, compaction,and workability.
Toronto: 353B	MODERATE: Seasonally high water table; moderate to moderately slow permeability.	MODERATE: Exposed subsoil somewhat difficult to vegetate; drainage needed for some seepy spots.	MODERATE: Exposed subsoil somewhat clayey and difficult to vegetate; seldom needed.	MODERATE: Moderate intake rate; moderately slow permeability.	SLIGHT: Features generally favorable.	SLIGHT in subsoil; MODERATE in underlying material - fair compaction and stability.
Virgil: 104A	MODERATE: Seasonally high water table; moderate to moderately slow permeability.	MODERATE: Exposed subsoil somewhat difficult to vegetate; Drainage needed in some seepy spots.	MODERATE: Seldom needed; exposed subsoil somewhat clayey.	MODERATE: Moderate intake rate; moderately slow permeability.	SEVERE: Hazard of excessive seepage through underlying material.	SLIGHT in subsoil; MODERATE in underlying material - fair compaction, stability, and workability.
Ward: 207A	SEVERE: Normally high water table; slow permeability; tile do not function well.	Not applicable.	Not applicable.	SEVERE: Slow intake rate and permeability; surface drainage needed.	SLIGHT: Features generally favorable; potential for dugout ponds.	MODERATE: Fair stability, and compaction; poor workability; good resistance to piping.
Xenia: 291B	SLIGHT: Natural drainage is adequate.	SLIGHT: Features generally favorable.	MODERATE: Exposed subsoil somewhat difficult to vegetate.	MODERATE: Moderate intake rate and permeability.	SLIGHT: Features generally favorable.	SLIGHT in subsoil; MODERATE in underlying material - fair compaction and stability.

(1) Atlanta is an uncorrelated series as of the date of this survey.

Soil Interpretations for Urban Development

Soils have many uses in urban development as listed in Table 9. The ratings and the soil properties significant or limiting for the use (indicated by footnotes) are given for each soil. These interpretations are based on soil properties in Table 8, test data, and field observations.

Following are explanations of columns in Table 9.

Topsoil as used here refers to soil material that may be used to topdress lawns, gardens, embankments, and road banks. The evaluation uses thickness, wetness, slope and texture.

Probable sources of *sand and gravel* are given for a depth of 5 feet. It should be recognized that some soils that are rated as poor may have sand or gravel below a depth of 5 feet.

Road fill for highway subgrade is based on performance of the soil material when excavated and used as borrow for subgrade. The ratings are based on such factors as shrink-swell potential, frost action, compaction characteristics, depth to water table, and organic matter content.

Local roads and streets are rated for the overall performance of the soil for the location of highways. Factors considered are depth to water table, texture, frost-heave potential, flooding hazard, percent slope, shrink-swell potential, and presence or absence of high organic material.

Shallow excavations refers to excavating or trenching to a depth of 5 feet. Characteristics that affect the rating are workability, slope, flooding hazard, depth to bedrock, and depth to water table.

Septic tank absorption fields require material that will absorb waste from domestic sewage disposal systems without contaminating the ground water. The major features considered are soil permeability, percolation rate, ground water level, slope, flooding hazard and texture of underlying material (USDA, 1967).

Sewage lagoons are impoundments that hold effluent from disposal systems. They require consideration of the soil for two functions -- as a vessel for the impounded area and as soil material for the embankments. Major features considered are depth to water table, slope, permeability, flooding hazard, and amount of organic matter.

Trench-type sanitary landfill refers to the digging of a trench so refuse may be placed in it. The refuse is then covered with the soil material excavated from the trench. Features considered in rating the soils are depth to water table, trafficability and workability of the soil, flooding hazard, depth to rock, and ability of soil to retard landfill leachate.

Dwellings with or without basements are buildings with three stories or less. Ratings are based on depth to water table, flooding hazard, slope, texture, shrink-swell potential, and depth to bedrock. Septic tank adsorption fields and corrosion potential for concrete are not considered in these ratings.

Shopping centers and small industrial buildings are buildings of three stories or less that have no basements and do not contain heavy machinery. Factors considered in making the soil ratings are wetness hazard, flooding hazard, limitations for foundations, depth to bedrock, erosion hazard, and amount of earth moving.

House trailer courts are areas that provide sites for parking of trailers and for utility hookups. Features important are depth to water table, slope, flooding hazard, and limitations for lawns and shrubs.

Table 9. — Soil Interpretations for Urban Development in the Champaign-Urbana Area

Soil series and mapping unit	Suitability as a source of:			Degree of limitations and features affecting use for:								
	Topsoil a/	Sand and gravel b/	Road fill for highway subgrade c/	Local roads and streets d/	Shallow excavations e/	Septic tanks f/ absorption fields	Sewage lagoons g/	Trench-type sanitary landfill h/	Dwellings with basements i/	Dwellings without basements i/	Shopping centers and small industrial buildings i/	House trailer courts i/
Atlanta*: 385B	Surface - Good Subsoil -Fair (1)	Not suitable	Subsoil - Poor (2) Underlying material - Fair to Poor (1,4)	Moderate (1,2)	Slight	Moderate (1)	Moderate (1,5)	Moderate (1)	Slight	Slight	Slight	Slight
Batavia: 105B	Surface-Fair (8) Subsoil-Fair (1)	Not suitable above 44 inches; poor below (1)	Subsoil - Poor (2) Underlying Material - Fair to Good (1,5)	Moderate (1,2)	Slight	Slight	Severe (2)	Severe (1,2)	Slight	Slight	Slight	Slight
Birkbeck: 233A, 233B, 233B2 233C, 233C2	Surface-Fair (8) Subsoil -Fair (1)	Not suitable	Subsoil - Poor (2) Underlying Material- Fair to Poor (1,4)	Moderate (1,2)	Slight	Moderate (1)	Moderate (1,5)	Moderate (1)	Slight	Slight	Slight on A and B slopes; Moderate on C slopes (4)	Slight on A and B slopes; Moderate on C slopes (4)
Brenton: 149A, 149B	Surface -Good Subsoil-Fair (1,4)	Not suitable above 43 inches; poor below (1)	Subsoil - Poor(2,7) Underlying material- Fair (1,5,7)	Moderate (1,2, 4,5)	Severe (1)	Severe (4)	Severe (2,4)	Severe (2,4)	Severe (2)	Moderate (2)	Moderate (2)	Moderate (2)
Brooklyn: 136A	Surface-Good Subsoil-Poor (1,3)	Not suitable above 43 inches; Poor below (1)	Subsoil - Poor (3,4,6) Underlying material- Poor to Fair (1,5,6)	Severe (3,6)	Severe (1)	Severe (2,3)	Severe (2,3)	Severe (3)	Severe (1)	Severe (1)	Severe (1)	Severe (1)
Camden: 134A, 134B, 134C, 134D2	Surface-Fair (8) Subsoil-Fair (1)	Not suitable above 42 inches; poor below (1)	Subsoil - Poor (2) Underlying Material- Fair to Good (1,5)	Moderate (1,2)	Slight on A,B, and C slopes; Moderate on D slopes (3)	Slight on A,B, and C slopes; Moderate on D slopes (5)	Severe (2)	Severe (1,2)	Slight on A,B, and C slopes; Moderate on D slopes (4)	Slight on A,B, and C slopes; Moderate on D slopes (4)	Slight on A and B slopes; Moderate on C slopes (4); Severe on D slopes (5)	Slight on A and B slopes; Moderate on C slopes(4); Severe on D slopes(5)
Catlin: 171B, 171C	Surface -Good Subsoil- Fair (1)	Not suitable	Subsoil - Poor (2) Underlying material - Fair to Poor (1,4)	Moderate (1,2)	Slight	Moderate (1)	Moderate (1,5)	Moderate (1)	Slight	Slight	Slight on B slopes; Moderate on C slopes (4)	Slight on B slopes; Moderate on C slopes (4)
Dana: 56B, 56B2, 56C, 56C2	Surface-Good to Fair (2) Subsoil-Fair (1)	Not suitable	Subsoil-Poor (2) Underlying material- Fair to Poor (1,4)	Moderate (1,2)	Moderate (2)	Moderate (1)	Moderate (1,5)	Moderate (1)	Moderate (3)	Slight	Slight on B slopes; Moderate on C slopes (4)	Slight on B slopes; Moderate on C slopes(4)
Dodge: 24B, 24C, 24C2	Surface-Fair (8) Subsoil-Fair	Not suitable.	Subsoil-Poor (2) Underlying material- Fair to Poor (1,4)	Moderate (1,2)	Slight	Moderate (1)	Moderate (1,5)	Slight	Slight	Slight	Slight on B slopes; Moderate on C slopes (4)	Slight on B slopes; Moderate on C slopes(4)
Drummer: 152A	Surface-Poor (1,3) Subsoil-Poor (1,3)	Not suitable above 41 inches; poor below (1)	Subsoil - Poor (2,6) Underlying material- Fair to Good (1,5,6)	Severe (3,6)	Severe (1)	Severe (3)	Severe (2,3)	Severe (2,3)	Severe (1)	Severe (1)	Severe (1)	Severe (1)
Elburn: 198A, 198B	Surface-Good Subsoil-Fair (1,4)	Not suitable above 54 inches; poor below (1)	Subsoil-Poor (2,7) Underlying material- Fair (1,5,7)	Moderate (1,2, 4,5)	Severe (1)	Severe (4)	Severe (2,4)	Severe (1,2,4)	Severe (2)	Moderate (2)	Moderate (2)	Moderate (2)
Fincastle: 496B	Surface-Fair (8) Subsoil-Fair (1,4)	Not suitable	Subsoil - Poor (2,7) Underlying material- Fair to Poor (1,4,7)	Moderate (1,2,4,5)	Severe (1)	Severe (4)	Moderate (1,4,5)	Severe (1,4)	Severe (2)	Moderate (2)	Moderate (2)	Moderate (2)
Flanagan: 154A, 154B	Surface - Good Subsoil-Fair (1,4)	Not suitable	Subsoil-Poor (2,7) Underlying material- Fair to Poor (1,4,7)	Moderate (1,2,4,5)	Severe (1)	Severe (4)	Moderate (4,5)	Severe (1,4)	Severe (2)	Moderate (2)	Moderate (2)	Moderate (2)

Table 9. — Soil Interpretations for Urban Development in the Champaign-Urbana Area (Continued)

Soil series and mapping unit	Suitability as a source of:			Degree of limitations and features affecting use for:								
	Topsoil a/	Sand and gravel b/	Road fill for highway subgrade c/	Local roads and streets d/	Shallow excavations e/	Septic tanks f/ absorption fields	Sewage lagoons g/	Trench-type sanitary landfill h/	Dwellings with basements i/	Dwellings without basements i/	Shopping centers and small industrial buildings i/	House trailer courts i/
Harpster: 67A	Surface-Poor (5) Subsoil-Poor (3,5)	Not suitable above 37 inches; poor below (1)	Subsoil - Poor (2,6) Underlying material-Fair to Good (1,5,6)	Severe (3,6)	Severe (1)	Severe (3)	Severe(2,3)	Severe (2,3)	Severe (1)	Severe (1)	Severe (1)	Severe (1)
Hennepin: 25F, 25F2	Surface-Poor (6) Subsoil-Poor (6)	Not suitable	Subsoil-Fair to Poor (1,4) Underlying material-Fair to Poor (1,4)	Severe (7)	Severe (3)	Severe(5,6)	Severe (1)	Severe (5)	Severe (5)	Severe (5)	Severe (5)	Severe (5)
Houghton: 103A	Poor (7)	Not suitable	Not suitable (6,8)	Very severe (8)	Severe (4)	Very severe (3,8)	Very severe (2,3,6)	Severe (2,3,6)	Very severe (1,6)	Very severe (1,6)	Very severe (1,6)	Very severe (1,6)
Kendall: 242A, 242B	Surface-Fair (8) Subsoil-Fair (1,4)	Not suitable above 52 inches; poor below (1)	Subsoil-Poor (2,7) Underlying material-Fair (1,5,7)	Moderate (1,2,4,5)	Severe (1)	Severe (4)	Severe (2,4)	Severe (1,2,4)	Severe (2)	Moderate (2)	Moderate (2)	Moderate (2)
LaRose: 60C, 60D2	Surface-Good to Fair (2) Subsoil-Fair (1)	Not suitable	Subsoil-Poor (2) Underlying Material-Fair to Poor (1,4)	Moderate (1,2)	Slight on C slopes; Moderate on D slopes (3)	Moderate (1)	Moderate on C slopes(1,5) Severe on D slopes (1)	Slight	Slight on C slopes; Moderate on D slopes (4)	Slight on C slopes; Moderate on D slopes (4)	Moderate on C slopes (4); Severe on D slopes (5)	Moderate on C slopes (4); Severe on D slopes (5)
Lawson: 451A	Good (3)	Not suitable	Poor (7,9)	Severe (4,6,9)	Severe (1,5)	Severe(4,7)	Severe (4,7)	Severe (4,7)	Severe (2,7)	Severe (2,7)	Severe (2,7)	Severe (2,7)
Miami: 27B, 27C, 27C2 27D, 27D2, 27E2	Surface-Fair (8) Subsoil-Fair (1)	Not suitable	Subsoil-Poor (2) Underlying material-Fair to Poor (1,4)	Moderate on B,C and D slopes (1,2); Severe on E slopes (7)	Slight on B and C slopes; Moderate on D slopes (3); Severe on E slopes (3)	Moderate on B, C, and D slopes (1); Severe on E slopes (5)	Moderate on B and C slopes (1,5); Severe on D and E slopes (1)	Slight on B, C, and D slopes; Severe on E slopes (5)	Slight on B and C slopes; Moderate on D slopes (4); Severe on E slopes (5)	Slight on B and C slopes; Moderate on D slopes (4); Severe on E slopes (5)	Slight on B slopes; Moderate on C slopes (4); Severe on D and E slopes (5)	Slight on B slopes; Moderate on C slopes(4); Severe on D and E slopes (5)
Otter: 76A	Good (3)	Not suitable	Poor (6,9)	Severe (3,6,9)	Severe (1,5)	Severe (3,7)	Severe (3,7)	Severe (3,7)	Severe (1,7)	Severe (1,7)	Severe (1,7)	Severe (1,7)
Parr: 221B, 221C,221C2, 221C3, 221D2	Surface-Good to Fair (2) Subsoil -Fair (1)	Not suitable	Subsoil-Poor (2) Underlying material-Fair to Poor (1,4)	Moderate (1,2)	Slight on B and C slopes; Moderate on D slopes (3)	Moderate (1)	Moderate on B and C slopes (1,5); Severe on D slopes (1)	Slight	Slight on B and C slopes; Moderate on D slopes (4)	Slight on B and C slopes; Moderate on D slopes (4)	Slight on B slopes; Moderate on C slopes (4); Severe on D slopes (5)	Slight on B slopes; Moderate on C slopes (4); Severe on D slopes (5)
Peotone: 330A	Surface-Fair (1) Subsoil-Poor (1,3)	Not suitable	Poor (2,6,9)	Severe (3,6)	Severe (1)	Severe (2,3)	Moderate (3,6)	Severe (3)	Severe (1)	Severe (1)	Severe (1)	Severe (1)
Plano: 199A, 199B	Surface-Good Subsoil-Fair (1)	Not suitable above 48 inches; poor below (1)	Subsoil-Poor (2) Underlying material-Fair to Good (1,5)	Moderate (1,2)	Slight	Slight	Severe (2)	Severe(1,2)	Slight	Slight	Slight	Slight
Proctor: 148A, 148B, 148C, 148C2	Surface-Good to Fair (2) Subsoil-Fair (1)	Not suitable above 44 inches; poor below (1)	Subsoil-Poor (2) Underlying material-Fair to Good (1,5)	Moderate (1,2)	Slight	Slight	Severe (2)	Severe (1,2)	Slight	Slight	Slight on A and B slopes; Moderate on C slopes(4)	Slight on A and B slopes; Moderate on C slopes (4)
Raub: 481A, 481B	Surface-Good Subsoil-Fair (1,4)	Not suitable	Subsoil-Poor (2,7) Underlying material-Fair to Poor (1,4,7)	Moderate (1,2,4,5)	Severe (1)	Severe (4)	Moderate (4,5)	Severe (1,4)	Severe (2)	Moderate (2)	Moderate (2)	Moderate (2)

Table 9. — Soil Interpretations for Urban Development in the Champaign-Urbana Area (Concluded)

Soil series and mapping unit	Suitability as a source of:			Degree of limitations and features affecting use for:								
	Topsoil a/	Sand and gravel b/	Road fill for highway subgrade c/	Local roads and streets d/	Shallow excavations e/	Septic tanks f/ absorption fields	Sewage lagoons g/	Trench-type sanitary landfill h/	Dwellings with basements i/	Dwellings without basements i/	Shopping centers and small industrial buildings i/	House trailer courts i/
Russell: 322B, 322B2, 322C, 322C2	Surface-Fair (8) Subsoil-Fair (1)	Not suitable	Subsoil-Poor (2) Underlying material-Fair to Poor (1,4)	Moderate (1,2)	Slight	Moderate (1)	Moderate (1,5)	Moderate (1)	Slight	Slight	Slight on B slopes Moderate on C slopes (4)	Slight on B slopes; Moderate on C slopes(4)
Sabina: 236A, 236B	Surface-Fair (8) Subsoil-Fair (1,4)	Not suitable	Subsoil-Poor (2,7) Underlying material-Fair to Poor (1,4,7)	Moderate (1,2,4,5)	Severe (1)	Severe (4)	Moderate (4,5)	Severe (1,4)	Severe (2)	Moderate (2)	Moderate (2)	Moderate (2)
St. Charles: 243A, 243B	Surface-Fair (8) Subsoil-Fair (1)	Not suitable above 42 inches; poor below (1)	Subsoil-Poor (2) Underlying material-Fair to Good(1,5)	Moderate (1,2)	Slight	Slight	Severe (2)	Severe (1,2)	Slight	Slight	Slight	Slight
Sawmill: 107A	Poor (1,3)	Not suitable	Poor (2,6,9)	Severe (3,6,9)	Severe (1,5)	Severe (3,7)	Severe (3,7)	Severe (1,3,7)	Severe (1,7)	Severe (1,7)	Severe (1,7)	Severe (1,7)
Saybrook 145B, 145C, 145C2	Surface-Good to Fair (2) Subsoil-Fair (1)	Not suitable	Subsoil-Poor (2) Underlying material-Fair to poor (1,4)	Moderate (1,2)	Slight	Moderate (1)	Moderate (1,5)	Slight	Slight	Slight	Slight on B slopes; Moderate on C slopes (4)	Slight on B slopes; Moderate on C slopes (4
Starks: 132A	Surface-Fair (8) Subsoil-Fair (1,4)	Not suitable above 50 inches; poor below (1)	Subsoil-Poor (2,7) Underlying material-Fair (1,5,7)	Moderate (1,2,4,5)	Severe (1)	Severe (4)	Severe (2,4)	Severe (1,2,4)	Severe (2)	Moderate (2)	Moderate (2)	Moderate (2)
Sunbury: 234A, 234B	Surface -Fair (8) Subsoil-Fair (1,4)	Not suitable	Subsoil-Poor (2,7) Underlying material-Fair to Poor (1,4,7)	Moderate (1,2,4,5)	Severe (1)	Severe (4)	Moderate (4,5)	Severe (1,4)	Severe (2)	Moderate (2)	Moderate (2)	Moderate (2)
Toronto: 353B	Surface-Fair (8) Subsoil-Fair (1,4)	Not suitable	Subsoil-Poor (2,7) Underlying material-Fair to Poor (1,4,7)	Moderate (1,2,4,5)	Severe (1)	Severe (4)	Moderate (4,5)	Severe (1,4)	Severe (2)	Moderate (2)	Moderate (2)	Moderate (2)
Virgil: 104A	Surface-Fair (8) Subsoil-Fair (1,4)	Not suitable above 49 inches; poor below (1)	Subsoil-Poor (2,7) Underlying material Fair (1,5,7)	Moderate (1,2,4,5)	Severe (1)	Severe (4)	Severe(2,4)	Severe (1,2,4)	Severe (2)	Moderate (2)	Moderate (2)	Moderate (2)
Ward: 207A	Surface-Fair (8) Subsoil-Poor (1,3)	Not suitable	Subsoil-Poor (2,4,6) Underlying material-Poor (4,6)	Severe (3,6)	Severe (1)	Severe (2,3)	Severe (3)	Severe (3)	Severe (1)	Severe (1)	Severe (1)	Severe (1)
Xenia: 291B	Surface-Good Subsoil-Fair (1)	Not suitable	Subsoil-Poor (2) Underlying material-Fair to Poor (1,4)	Moderate (1,2)	Moderate (2)	Moderate (1)	Moderate (1,5)	Moderate (1)	Moderate (3)	Slight	Slight	Slight

*Atlanta is an uncorrelated series as of the date of this survey.

a/ Topsoil	(1) Clayey-textured material, not easily worked when wet. (2) Surface layer is thin if eroded. (3) Normally high water table, difficult to reclaim remaining soil. (4) Occasionally high water table. (5) Material contains excess amounts of lime (calcareous). (6) Slopes are difficult to work and erosion is a problem when stripped. (7) Possible source of organic material - muck. (8) Low organic matter content.
b/ Sand and gravel	(1) Usually contain considerable fines and the gravel content is low.
c/ Road fill for highway subgrade	(1) Low shrink-swell potential. (2) Moderate shrink-swell potential. (3) High shrink-swell potential. (4) Fair to poor compaction characteristics. (5) Fair compaction characteristics (6) Normally high water table. (7) Occasionally high water table. (8) Organic material - muck. (9) High organic matter content.
d/ Local roads and streets	(1) Fair stability when compacted. (2) Moderate shrink-swell potential. (3) Normally high water table. (4) Occasionally high water table. (5) Moderate frost-action potential. (6) High frost-action potential. (7) Erosion hazard due to slopes; much cutting and filling needed. (8) Organic material-muck, unstable. (9) Flooding hazard.
e/ Shallow excavations	(1) Normally high water table. (2) Occasionally high water table. (3) Slopes limit use. (4) Organic material-muck. (5) Flooding hazard.
f/ Septic tank Absorption fields	(1) Percolation rate of 45 to 60 minutes per inch. (2) Percolation rate of less than 60 minutes per inch. (3) Normally high water table. (4) Occasionally high water table. (5) Slopes affect design and construction. (6) Hazard of effluent seeping out downslope. (7) Flooding hazard. (8) Unsuitable material for absorption fields.
g/ Sewage lagoons	(1) Slope affects design and construction. (2) Hazard of excessive seepage in underlying material. (3) Normally high water table. (4) Occasionally high water table. (5) Moderately permeable material below a depth of about 3 feet. (6) High organic matter content. (7) Flooding hazard.
h/ Trench-type sanitary landfills	(1) Fair workability and trafficability. (2) Hazard of underground water contamination. (3) Normally high water table. (4) Occasionally high water table. (5) Slopes limit use. (6) Unsuitable cover material - muck. (7) Flooding hazard.
i/ Dwellings with and without basements, shopping centers and small industrial buildings and house trailer courts	(1) Normally high water table. (2) Occasionally high water table. (3) Occasionally water table at 3 to 5 feet. (4) Moderate amounts of grading needed, some cutting and filling. (5) Large amounts of grading needed, much cutting and filling. (6) Unstable organic material - muck. (7) Flooding hazard.

WOODLAND, WILDLIFE, AND RECREATION SOIL INTERPRETATIONS

Woodland Soil Interpretations

Forests covered an area along the Salt Fork River northeast of Urbana prior to the time of settlement. The early settlers cleared most of the land and only a small amount of woodland remains in the Champaign-Urbana area.

The soils of the Champaign-Urbana area have been placed in woodland-suitability groups on the basis of soil characteristics that affect the production of timber. In Table 10, the groups are described briefly and the soils are listed on which trees did and did not occur naturally, both site index and average annual growth in board feet are given, and the limitations and hazards that affect the use of the soils for woodland are rated. Also shown are preference ratings of trees for existing stands and for plantings either as plantations or windbreaks.

Following are explanations of columns in Table 10:

Site index is an average height, in feet, of the dominant and codominant free-growing trees at a given age. For oak, height at age 50 years is used. The site indexes listed here were determined by foresters of the Illinois Division of Forestry, the U.S. Forest Service, the University of Illinois, and the Soil Conservation Service, working with soil classifiers who mapped the soils.

Average annual growth rate is given in board feet per acre. The figures are for well-stocked, well-managed stands and are calculated to age 60 for hardwoods (Putnam et al., 1960) (Schnur, 1937).

[1] William M. Clark, Woodland Conservationist, USDA, SCS, Illinois, assisted in the preparation of this section.

Limitations and hazards include those soil-related features that affect the production of timber. These are erosion hazard, equipment limitations, seedling mortality, and plant competition. These factors are rated as to whether the limitation or hazard is slight, moderate, or severe. They are explained in the following paragraphs.

Erosion hazard refers to the potential risk of erosion if the site is managed according to acceptable standards for woodland use. Factors that influence these risks are the length and steepness of the slopes and the water-holding capacity of the soil. The hazard of erosion is increased if the watershed above the wooded site is cultivated.

A rating of slight indicates that control of erosion is not a special problem. Harvesting is not restricted by the need for special erosion practices, but normal care needs to be used on slopes to prevent the formation of gullies.

A rating of moderate indicates that some care is needed to control erosion during harvesting operations. Heavy traffic over extended periods may result in severe erosion of roads and trails unless special construction and maintenance measures are used.

A severe rating indicates that intensive treatment, special equipment, and special methods of operation must be used to minimize soil loss. Soils rated severe generally have steep slopes, rapid runoff, and low cohesive qualities.

Equipment limitation depends on soil characteristics and topographic features that restrict the use of equipment in planting, tending, or harvesting trees.

A slight rating indicates that there is little or no restriction on the type of equipment or on the time of year that it can be used.

A rating of moderate indicates that the use of equipment is restricted

because slopes are steep, or because the soils are wet for periods of up to three months.

A rating of severe indicates that the use of equipment is restricted because of very steep slopes that require special harvesting methods, or because, for more than three months during the year, the soils are too wet for the use of equipment.

Seedling mortality refers to the expected loss of natural or planted tree seedlings as a result of soil characteristics or topographic features, not as a result of plant competition. It is assumed that the natural seed supply is adequate, the stock is good, planted seedlings are properly cared for, climatic conditions are normal, and there are adequate openings in the canopy of the natural stand.

A rating of slight indicates an expected seedling mortality of up to 25 percent. Ordinarily, natural regeneration will take place. For planted seedlings, satisfactorily stocking will be obtained from the initial planting.

A moderate rating indicates an expected seedling mortality of 25 to 50 percent, mainly because of severe erosion, droughtiness, or hot exposure. Natural revegetation will not always supply adequate and immediate stocking. For planted seedlings, some replanting may be needed to fill open spaces.

A rating of severe indicates an expected seedling mortality of more than 50 percent, mainly because the soils are shallow, stony, steep, or extremely wet. Natural regeneration cannot be relied on for stands of desirable trees. For planted seedlings, special planting techniques and considerable replanting may be required.

Plant competition refers to the rate at which unwanted trees, shrubs, and weeds are likely to invade a given site when openings are made in the canopy.

A slight rating indicates that competition from other plants is no special problem. The soils are such that invasion by undesirable species will not impede growth of desirable species.

A rating of moderate indicates that plant competition develops but generally does not prevent an adequate stand from becoming established. Establishment may be delayed, however, and initial growth slowed. Simple management techniques can be used to minimize the problem.

A rating of severe indicates that plant competition prevents desirable trees from restocking naturally. Where competition is severe, special management and careful preparation of the site are necessary. Such treatment includes use of approved chemical sprays, girdling, and metered injectors.

Tree species preference ratings for adapted species in existing stands is a list of trees that are considered most desirable and least desirable. Trees listed as most desirable are those that have high market value and that grow well on the specified site. They should be protected and favored in existing stands. Trees listed as least desirable have low market value or undesirable growth habits. They should be discouraged or removed to allow for the growth of desirable trees.

Planting guide is a list of trees that are suitable for planting on those soils listed in the management group. Trees are listed for plantation planting and for windbreaks.

Table 10. — Woodland Soil Interpretations in the Champaign-Urbana Area

Woodland group and Soil series	Potential productivity		Limitations and hazards	Species occurring and preference rating		Species suitable for planting	
	Site index	Average annual growth per acre 1/ (board feet)		More desirable	Less desirable	Plantation	Windbreaks
Group 1: Nearly level to strongly sloping, moderately well and well drained, moderately permeable soils on uplands and terraces. Soils on which trees occur naturally: Atlanta 2/, Batavia, Birkbeck, Camden, Dodge, Miami, Russell, St. Charles, Xenia. Soils on which trees do not occur naturally: Catlin, Dana, La Rose, Plano, Proctor, Saybrook.	Upland oaks- 85 to 95	Upland oaks - 350 - 450	Erosion hazard - slight. Equipment limitations - slight. Seedling mortality - slight Plant competition - slight to moderate.	White oak, northern red oak, black oak, black walnut, green ash.	Hickory, soft maple, post oak, crabapple, hawthorn.	Black walnut, cottonwood, sycamore, white oak, northern red oak, ash, white pine, red pine, sugar maple, Scotch pine. 3/	Norway spruce, white pine, red pine, white spruce, Douglas fir.
Group 2: Moderately steeply or steeply sloping, well drained, moderately permeable soils on uplands. Soils on which trees occur naturally: Hennepin, Miami. Soils on which trees do not occur naturally: Parr.	Upland oaks - 80 to 90	Upland oaks - 300-400	Erosion hazard - moderate. Equipment limitations - moderate. Seedling mortality - slight. Plant competition - moderate.	White oak, northern red oak, green ash.	Hickory, black oak, crabapple, hawthorn.	Black walnut, white oak, northern red oak, ash, white pine, red pine, sugar maple, Scotch pine. 3/	Douglas fir, white spruce, Norway spruce, white pine, red pine.
Group 3: Nearly level or gently sloping, somewhat poorly drained, moderately and moderately slowly permeable soils on uplands and terraces. Soils on which trees occur naturally: Fincastle, Kendall, Sabina, Starks, Sunbury, Toronto, Virgil. Soils on which trees do not occur naturally: Brenton, Elburn, Flanagan, Raub.	Upland oaks - 75 - 85	Upland oaks - 250 - 350	Erosion hazard - Slight. Equipment limitations - slight, to moderate. Seedling mortality - slight . Plant competition - slight to severe.	White oak, northern red oak, black walnut, green ash.	Hickory, soft maple, post oak, crabapple, hawthorn.	White pine, Norway spruce, ash, northern red oak, black walnut, cottonwood, sycamore, white oak, red pine, sugar maple, Scotch pine 3/, red maple.	White pine, red pine, Norway spruce, Douglas fir, white spruce.
Group 4: Nearly level, poorly drained, slowly permeable soils on uplands and terraces. Soils on which trees occur naturally: Ward. Soils on which trees do not occur naturally: Brooklyn.	Pin oak - 75 - 85	Pin oak - 200 - 300	Erosion hazard - slight. Equipment limitations - moderate. Seedling mortality - moderate. Plant competition - severe.	White oak, pin oak, green ash.	Hickory, box elder, willow.	Pin oak, green ash, eastern larch, red maple.	Arbor vitae.
Group 5: Nearly level, poorly to somewhat poorly drained, moderately rapid to moderately slowly permeable soils on uplands, terraces, and bottomlands. Soils on which trees occur naturally: Lawson, Otter, Sawmill. Soils on which trees do not occur naturally: Drummer, Harpster, Houghton, Peotone.	Pin oak - 85 - 95 Cottonwood- 95-105	Pin Oak - 350 - 450 Cottonwood - 450 - 550	Erosion Hazard - slight. Equipment limitations - moderate. Seedling mortality - moderate. Plant competition - severe.	Cottonwood, sycamore, pin oak, sweet gum.	Hickory, box elder, willow, honey locust.	Red maple, pin oak, green ash, eastern larch.	Arbor vitae.

1/ Average annual growth measured by Doyle's rule.

2/ Atlanta is an uncorrelated series as of the date of this survey.

3/ For Christmas trees only.

Wildlife Soil Interpretations

Wildlife is dependent on the land for food, water, and cover. The management of wildlife cannot be considered apart from its interaction with plants and soil. Each species of wildlife has different habitat requirements. Some of these requirements can be controlled or modified by man.

Most managed wildlife habitats are developed, improved, or maintained by (a) planting suitable vegetation; (b) manipulating existing vegetation; (c) inducing natural establishment of desired plants; (d) adding a water supply; or (e) by combination of such measures. Soil properties limiting with respect to plant growth or water management include (a) effective rooting zone; (b) surface soil texture; (c) available water capacity; (d) natural soil drainage; (e) hazard of flooding; (f) steepness of slope; and (g) soil permeability. These soil factors were used to group the soil mapping units of the Champaign-Urbana area into ten soil groups. Each of these groups is rated for wildlife habitat in Table 11.

In Table 11, the soil groups are described and the mapping units within each group are listed. The wildlife habitat elements and kinds of wildlife habitat are rated and the limiting factors are given.

Seven wildlife habitat elements are rated. The levels of suitability are expressed as good, fair, poor, and very poor.

A good rating indicates no problems or limitations exist or they can be overcome by ordinary management. Fair rating indicates the problems limit use to some degree or special management methods are needed. A poor rating indicates extreme caution or unusual management methods are necessary. Very poor means the problems are so extreme that the site is not suitable for the use.

Following is an explanation of columns in Table 11:

Grain and seed crops are planted to produce wildlife food. The crops considered are corn, soybeans, wheat, oats, millet, buckwheat, cowpeas, sorghums, and sunflowers.

Domestic grasses and legumes are established by planting to provide wildlife cover as well as food. Examples of these crops are fescue, bluegrass, brome, timothy, redtop, orchardgrass, reed canarygrass, clovers, trefoils, crownvetch, alfalfa, sericea lespedeza, and switchgrass.

Wild herbaceous plants refer to native or naturally established dryland herbaceous grasses and forbs (including weeds) that provide food and cover for wildlife. Examples are beggarweed, goldenrod, dandelions, lespedeza, partridge pea, ragweed, bluestem, pokeweed, wheatgrasses, and fescue.

Hardwood trees include non-coniferous trees, shrubs, and woody vines that produce fruits, nuts, buds, catkins, twigs, or foliage used extensively as food by wildlife; and which are commonly established through natural processes but also may be planted. These include oaks, hickory, sassafras, dogwoods, cherries, maples, birches, poplars, grapes, honeysuckle, and brambles.

Coniferous plants consist of cone-bearing trees and shrubs of importance to wildlife primarily as cover, but which may also furnish food in the form of browse, seeds, or fruit-like cones. They commonly are planted but may establish naturally after once bearing seeds. Examples of these plants are pine, spruce, fir, yew, cedar, and juniper.

Wetland plants consist of annual and perennial wild herbaceous plants of moist or wet sites, exclusive of floating or submerged aquatics, that produce food or cover extensively used mainly by wetland forms of wildlife. Examples of these plants are smartweeds, wild millets, rushes, sedges, reeds, switchgrass, and cattails.

Shallow water areas refer to areas of surface water with average depth of less than 5 feet which are useful to wildlife. They may be natural wet areas or those created by dams or levees or by water-control devices in marshes or streams. Examples are muskrat marshes, waterfowl feeding areas, wildlife watering developments, wildlife ponds, and beaver ponds.

Three kinds of wildlife habitat are rated openland wildlife habitat, woodland wildlife habitat, and wetland wildlife habitat. The ratings of wildlife habitat are made on the basis of weighting factors assigned to a selection of habitat elements appropriate to the kind of wildlife habitat. For example, grain and seed crops, domestic grasses and legumes, and wild herbaceous plants are given greater weight than hardwood trees as habitat elements for openland wildlife.

Openland wildlife refers to birds and mammals that normally frequent cropland, pastures, lawns, and areas overgrown with grasses, herbs, and shrubby growth. Examples of this kind of wildlife are the quail, meadowlark, pheasant, field sparrow, killdeer, cottontail rabbit, red-winged blackbird, red fox, and woodchuck.

Woodland wildlife refers to birds and mammals that normally frequent wooded areas of hardwood trees, coniferous trees, or mixtures of such plants. Examples of this kind of wildlife are the thrush, vireo, scarlet tanager, dove, squirrels, gray fox, deer, wild turkey, woodcock, woodpecker, and racoon.

Wetland wildlife refers to birds and mammals that normally frequent wet areas such as ponds, marshes, and swamps. Examples of this kind of wildlife are the ducks, geese, heron, mink, muskrat, kingfisher, and beaver.

Table 11. — Wildlife soil interpretations in the Champaign-Urbana Area

Soil groups and mapping unit symbols	Suitability and features affecting wildlife habitat elements							Suitability and features affecting kinds of wildlife habitat		
	Grain and seed crops	Domestic grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland	Woodland	Wetland
Group 1. Well and moderately well drained soils with a silt loam surface layer, nearly level and very gently sloping, moderately permeable. 2ɨB, 27B, 56B, 56B2, 105B, 13ɨA, 13ɨB, 1ɨ5B, 1ɨ8A, 1ɨ8B, 171B, 199A, 199B, 221B, 233A, 233B, 233B2, 2ɨ3A, 2ɨ3B, 291B, 322B, 322B2, 385B.	Good	Good	Good	Good	Good	Poor Well and moderately well drained.	Poor Well and moderately well drained.	Good	Good	Poor Severely limited amounts of wetland plants and natural wet areas.
Group 2. Well and moderately well drained soils with a silt loam or clay loam surface layer, gently sloping, moderately permeable 4 to 7 percent slope. 2ɨC, 2ɨC2, 27C, 27C2, 56C, 56C2, 60C, 13ɨC, 1ɨ5C, 1ɨ5C2, 1ɨ8C, 1ɨ8C2, 171C, 221C, 221C2, 221C3, 233C, 233C2, 322C, 322C2.	Good Erosion hazard.	Good	Good	Good	Good	Poor Well and moderately well drained.	Very poor Gently sloping; Well and moderately well drained.	Good	Good	Very Poor Wetland plants not adapted; no natural wet areas.
Group 3. Well drained soils with a silt loam surface layer, moderately sloping, moderately permeable. 27D, 27D2, 60D2, 13ɨD2, 221D2.	Fair Erosion hazard.	Good	Good	Good	Good	Very poor Strongly sloping; Well drained.	Very poor Moderately sloping.	Good	Good	Very Poor Wetland plants not adapted; no natural wet areas.
Group 4. Well drained soils with a silt loam surface layer, strongly sloping and moderately steep, moderately permeable. 25F, 25F2, 27E2.	Poor Erosion hazard.	Fair Erosion hazard.	Good	Good	Good	Very poor Strongly sloping and moderately steep; well drained.	Very poor Strongly sloping and moderately steep.	Fair Average amount of food and cover.	Good	Very Poor Wetland plants not adapted; no natural wet areas.
Group 5. Somewhat poorly drained soils with a silt loam surface layer, nearly level, moderately and moderately slowly permeable. 10ɨA, 132A, 1ɨ9A, 15ɨA, 198A, 23ɨA, 236A, 2ɨ2A, ɨ81A.	Fair Wetness.	Good	Good	Good	Good	Fair Somewhat poorly drained.	Fair Somewhat poorly drained.	Good	Good	Fair Somewhat limited amounts of wetland plants and natural wet areas.
Group 6. Somewhat poorly drained soils with a silt loam surface layer, very gently sloping, moderately and moderately slowly permeable. 1ɨ9B, 15ɨB, 198B, 23ɨB, 236B, 2ɨ2B, 353B, ɨ81B, ɨ96B	Fair Wetness.	Good	Good	Good	Good	Fair Somewhat poorly drained.	Poor Gently sloping.	Good	Good	Poor Severely limited amounts of wetland plants and natural wet areas.
Group 7. Poorly drained soils with a silty clay loam surface layer, nearly level, moderately permeable. 67A, 152A.	Fair Wetness.	Fair Wetness	Fair Wetness	Fair Wetness	Fair Wetness	Good	Fair Moderately permeable.	Fair Average amount of food and cover.	Fair Average amount of tree growth.	Fair Somewhat limited amounts of wetland plants and natural wet areas.
Group 8. Poorly drained soils with silt loam and silty clay loam surface layer, nearly level, moderately slowly and slowly permeable. 136A, 207A, 330A.	Poor Wetness.	Poor Wetness	Poor Wetness	Poor Wetness	Poor Wetness	Good	Good	Poor Wetness limits species and growth of plants.	Poor Wetness limits growth and adapted species.	Good
Group 9. Somewhat poorly drained soils with a silt loam surface layer, nearly level, moderately permeable, subject to flooding. ɨ57A.	Poor Subject to flooding.	Poor Subject to flooding	Fair Subject to flooding	Good	Good	Fair Somewhat poorly drained.	Fair Somewhat poorly drained; moderately permeable.	Fair Average amount of food and cover.	Good	Fair Somewhat limited amounts of wetland plants and natural wet areas.
Group 10. Poorly drained soils with a silt loam or silty clay loam surface layer, nearly level, moderately or moderately slowly permeable, subject to flooding. 76A, 107A.	Poor Subject to flooding.	Poor Subject to flooding; wetness.	Fair Subject to flooding.	Fair Wetness	Fair Wetness	Good	Fair Moderately or moderately slowly permeable.	Fair Average amount of food and cover.	Fair Average amount of tree growth	Fair Somewhat limited amounts of wetland plants and natural wet areas.
Group 11. Very poorly drained organic soil, nearly level, moderately rapidly permeable. 103A.	Very Poor Organic material-muck.	Poor Wetness, muck.	Poor Wetness	Poor Wetness	Poor Wetness	Good	Good	Poor Wetness limits species and growth of plants.	Poor Wetness limits growth and adapted species.	Good

Recreation Soil Interpretations

The soils of the Champaign-Urbana area are rated for the development of outdoor recreation. Table 12 gives the rating for each soil and gives soil features significant to the rating. Each soil series is listed alphabetically together with the appropriate mapping symbols for the series.

The uses rated (columns in Table 12) and the main soil features affecting each use are described below:

Cottages and utility buildings are seasonal or year-around cottages, washrooms and bathrooms, picnic shelters and service buildings. Factors considered are wetness and flood hazard, slope, shrink-swell and frost potential, and depth to bedrock. Additional items that may be considered in final evaluation are suitability to septic tank absorption fields, and presence of loose sand.

Camping areas are areas suitable for tent and camp trailer sites with accompanying activities. They are used frequently during camping season and should be suitable for unsurfaced parking for car and camp trailers and heavy foot traffic. Features considered are wetness and flooding hazard, permeability, slope, surface soil texture, and rockiness.

Picnic and extensive play areas are areas suitable for heavy foot traffic and used by people for the consumption of food in a natural outdoor environment, flying kites, or open space for children to play unorganized games. Ratings are based on wetness and flooding hazard, slope, surface soil texture, and rockiness. Ratings do not include presence of trees or ponds or suitability of the soil to grow and maintain vegetation.

Playgrounds and intensive play areas are areas that are developed for playgrounds and organized games such as baseball, football, tennis, badminton, and the like. They are subject to heavy foot traffic and generally require a level surface, good drainage, and a soil texture and consistence that gives a firm surface.

Paths and trails apply to areas that are to be used for trails, cross-country hiking, bridle paths, and other intensive uses that allow for the movement of people. It is assumed that these areas are to be used as they occur in nature and that little soil will be moved. Ratings are based on wetness and flooding hazard, slope, surface soil texture, stoniness, and rockiness.

Golf course fairways apply only to the fairways. Greens, traps, hazards, and tees are man-made, generally from disturbed, transported material. For best use, fairways should be well drained and firm, be free of flooding and standing water during use periods, have good trafficability, contain a minimum of coarse stones, and have gently undulating slopes.

Table 12. — Recreation Soil Interpretations in the Champaign-Urbana Area (Degree and Kind of Limitation)*

Soil Series and Mapping Unit	Cottages and Utility Buildings	Camping Areas	Picnic and Extensive Play Areas	Playgrounds and Intensive Play Areas	Paths and Trails	Golf Course Fairways
Atlanta * 385B	Moderate (7)	Slight	Slight	Moderate (4)	Slight	Slight
Batavia 105B	Moderate (7)	Slight	Slight	Moderate (4)	Slight	Slight
Birkbeck 233A,233B,233B2,233C,233C2	Moderate (7)	Slight	Slight	Slight on A slopes Moderate on B and C slopes (4)	Slight	Slight
Brenton 149A, 149B	Moderate (2,5,7)	Moderate (2,6)	Moderate (2,6)	Moderate (2,6)	Moderate (2,6)	Moderate (2,6)
Brooklyn 136A	Severe (1,3,5,8)	Severe (1,3,6)	Severe (1,3,6)	Severe (1,3,6)	Severe (1,3,6)	Severe (1,3,6,12)
Camden 134A, 134B, 134C, 134D2	Moderate (4,7)	Slight on A,B, and C slopes Moderate on D slopes (4)	Slight on A,B,and C slopes Moderate on D slopes (4)	Slight on A slopes Moderate on B and C slopes(4) Severe on D slopes (4,11)	Slight	Slight on A, B,and C slopes Moderate on D slopes
Catlin 171B, 171C	Moderate (7)	Slight	Slight	Moderate (4)	Slight	Slight
Dana 56B, 56B2, 56C, 56C2	Moderate (7)	Slight	Slight	Moderate (4)	Slight	Slight
Dodge 24B, 24C, 24C2	Moderate (7)	Slight	Slight	Moderate (4)	Slight	Slight
Drummer 152A	Severe (1, 5, 7)	Severe (1,6)	Severe (1,6)	Severe (1,6)	Severe (1,6)	Severe (1,6,12)
Elburn 198A, 198B	Moderate (2,5,7)	Moderate (2,6)	Moderate (2,6)	Moderate (2,6)	Moderate (2,6)	Moderate (2,6)
Fincastle 496B	Moderate (2,5,7)	Moderate (2,6)	Moderate (2,6)	Moderate (2,6)	Moderate (2,6)	Moderate (2,6)
Flanagan 154A, 154B	Moderate (2,5,7)	Moderate (2,6)	Moderate (2,6)	Moderate (2,6)	Moderate (2,6)	Moderate (2,6)
Harpster 67A	Severe (1,5,7)	Severe (1,6)	Severe (1,6)	Severe (1,6)	Severe (1,6)	Severe (1,6,12)
Hennepin 25F, 25F2	Severe (4,11)	Severe (4,11)	Severe (4,11)	Severe (4,11)	Severe (4)	Severe (4,11)
Houghton 103A	Very severe (1,3,9,10)	Very severe (1,3,9,10)	Very severe (1,3,9,10)	Very severe (1,3,9,10)	Very severe (1,3,9)	Very severe (1,3,9)
Kendall 242A, 242B	Moderate (2,5,7)	Moderate (2,6)	Moderate (2,6)	Moderate (2,6)	Moderate (2,6)	Moderate (2,6)
LaRose 60C, 60D2	Moderate (4,7)	Slight on C slopes Moderate on D slopes (4)	Slight on C slopes Moderate on D slopes (4)	Moderate on C slopes (4) Severe on D slopes (4,11)	Slight	Slight on C slopes Moderate on D slopes (4)
Lawson 451A	Severe (2,3,5)	Severe (2,3,6)	Moderate (2,3,6)	Severe (2,3,6)	Moderate (2,3)	Severe (2,3,6,12)
Miami 27B, 27C, 27C2, 27D, 27D2, 27E2	Moderate (4,7) Severe on E slopes (4,11)	Slight on B and C slopes Moderate on D slopes (4) Severe on E slopes (4,11)	Slight on B and C slopes Moderate on D slopes (4) Severe on E slopes (4,11)	Moderate on B and C slopes (4) Severe on D and E slopes (4,11)	Slight on B,C, and D slopes Moderate on E slopes (4)	Slight on B and C slopes Moderate on D slopes (4) Severe on E slopes (4,11)
Otter 76A	Severe (1,3,5)	Severe (1,3,6)	Severe (1,3,6)	Severe (1,3,6)	Severe (1,3,6)	Severe (1,3,6,12)
Parr 221B,221C,221C2,221C3,221D2	Moderate (4,7)	Slight on B and C slopes Moderate on D slopes (4)	Slight on B and C slopes Moderate on D slopes (4)	Moderate on B and C slopes (4) Severe on D slopes (4,11)	Slight	Slight on B and C slopes Moderate on D slopes
Peotone 330A	Severe (1,3,5,7)	Severe (1,3,6)	Severe (1,3,6)	Severe (1,3,6)	Severe (1,3,6)	Severe (1,3,6,12)
Plano 199A, 199B	Moderate (7)	Slight	Slight	Slight on A slopes Moderate on B slopes (4)	Slight	Slight

Table 12. — Recreation Soil Interpretations in the Champaign-Urbana Area (Degree and Kind of Limitation) (Concluded)*

Soil Series and Mapping Unit	Cottages and Utility Buildings	Camping Areas	Picnic and Extensive Play Areas	Playgrounds and Intensive Play Areas	Paths and Trails	Golf Course Fairways
Proctor 148A,148B,148C,148C2	Moderate (7)	Slight	Slight	Slight on A slopes Moderate on B and C slopes (4)	Slight	Slight
Raub 481A, 481B	Moderate (2,5,7)	Moderate (2,6)	Moderate (2,6)	Moderate (2,6)	Moderate (2,6)	Moderate (2,6)
Russell 322B,322B2,322C,322C2	Moderate (7)	Slight	Slight	Moderate (4)	Slight	Slight
Sabina 236A, 236B	Moderate (2,5,7)	Moderate (2,6)	Moderate (2,6)	Moderate (2,6)	Moderate (2,6)	Moderate (2,6)
St. Charles 243A, 243B	Moderate (7)	Slight	Slight	Slight on A slopes Moderate on B slopes (4)	Slight	Slight
Sawmill 107A	Severe (1,3,5,7)	Severe (1,3,6)	Severe (1,3,6)	Severe (1,3,6)	Severe (1,3,6)	Severe (1,3,6,12)
Saybrook 145B, 145C, 145C2	Moderate (7)	Slight	Slight	Moderate (4)	Slight	Slight
Starks 132A	Moderate (2,5,7)	Moderate (2,6)	Moderate (2,6)	Moderate (2,6)	Moderate (2,6)	Moderate (2,6)
Sunbury 234A, 234B	Moderate (2,5,7)	Moderate (2,6)	Moderate (2,6)	Moderate (2,6)	Moderate (2,6)	Moderate (2,6)
Toronto 353B	Moderate (2,5,7)	Moderate (2,6)	Moderate (2,6)	Moderate (2,6)	Moderate (2,6)	Moderate (2,6)
Virgil 104A	Moderate (2,5,7)	Moderate (2,6)	Moderate (2,6)	Moderate (2,6)	Moderate (2,6)	Moderate (2,6)
Ward 207A	Severe (1,3,5,8)	Severe (1,3,6)	Severe (1,3,6)	Severe (1,3,6)	Severe (1,3,6)	Severe (1,3,6,12)
Xenia 291B	Moderate (7)	Slight	Slight	Moderate (4)	Slight	Slight

* Atlanta is an uncorrelated series as of the date of this survey.

a/ Limitations are: (1) Normally high water table. (2) Occasionally high water table. (3) Flooding or ponding hazard. (4) Slope limits use. (5) Subject to frost-action. (6) Usually soft and wet in the spring and slow to dry. (7) Moderate shrink-swell potential. (8) High shrink-swell potential. (9) Unstable organic material. (10) Soil blowing and fire hazard when dry. (11) Turf difficult to establish and maintain. (12) Turf easily damaged when wet.

GLOSSARY

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as crumbs, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Soil material, such as sand, silt, or clay, that has been deposited on land by streams.

Available water capacity. The capacity of the soil to hold water that can be used by plants. Water held between the wilting point (15 atmospheres of tension) and the field capacity (1/3 atmosphere). In this publication classes of available water capacity to a depth of 60 inches are as follows:

Very high - 12 inches or more
High - 9 to 12 inches
Moderate - 6 to 9 inches
Low - 3 to 6 inches
Very low - Less than 3 inches

Base saturation. The degree to which material that has base-exchange properties is saturated with exchangeable cations other than hydrogen, expressed as a percentage of the cation-exchange capacity.

Bearing capacity. The ability of a soil to support a building or other load.

Bottomland. Low ground lying adjacent to a stream which normally overflows during flood periods.

Calcareous soil. A soil that contains enough calcium carbonate (often with magnesium carbonate) to effervesce (fizz) visibly when treated with cold, dilute hydrochloric acid.

Clay. As a soil separate, the mineral soil particles that are less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of clay on the surface of a soil aggregate. Synonyms: clay coat, clay skin.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrations of compounds, or of soil grains cemented together. The composition of some concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are examples of material commonly found in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose. Noncoherent when dry or moist; does not hold together in a mass.

Friable. When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm. When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic. When wet, readily deformed by moderate pressure but can be pressed into a lump; will from a "wire" when rolled between thumb and forefinger.

Sticky. When wet, adheres to other material, and tends to stretch somewhat and pull apart, rather than to pull free from other material.

Hard. When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft. When dry, breaks into powder or individual grains under very slight pressure.

Cemented. Hard and brittle; little affected by moistening.

Contour farming. Plowing, cultivating, planting, and harvesting in rows that are at right angles to the natural direction of the slope or parallel to the terrace grade.

Contour strip-cropping. Growing crops in strips that follow the contour or are parallel to terraces or diversions. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Cover crop. A close-growing crop grown primarily to improve and to protect the soil between periods of regular crop production; or a crop grown between trees and vines in orchards and vineyards.

Depth, soil. The depth in inches to a root-impeding layer in the soil.

Deep	36 to 60 inches
Moderately deep	20 to 36 inches
Shallow	10 to 20 inches
Very shallow	Less than 10 inches

Drainage, soil. Refers to the conditions of frequency and duration of periods of saturation or partial saturation that existed during the development of the soil, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven different classes of natural soil drainage are recognized.

Excessively drained soils are commonly very porous and rapidly permeable and have a low water-holding capacity.

Somewhat excessively drained soils are also very permeable and are free from mottling throughout their profile.

Well-drained soils are nearly free from mottling and are commonly of intermediate texture.

Moderately well-drained soils commonly have a slowly permeable layer in or immediately beneath the solum. They have uniform color in the A and upper B horizons and have mottling in the lower B and C horizons.

Somewhat poorly drained soils are wet for significant periods but not all the time, and in the Alfisol soils commonly have mottlings below a depth of 6 to 16 inches, in the lower A horizon and in the B and C horizons.

Poorly drained soils are wet for long periods and are light gray and generally mottled from the surface downward, although mottling may be absent or nearly so in some soils.

Very poorly drained soils are wet nearly all the time. They have a dark-gray or black surface layer and are gray or light gray, with or without mottling, in the deeper parts of the profile.

Erosion. The wearing away of the land surface by wind (sandblast), running water, and other geological agents. Uneroded means that more than 7 inches of the surface layer remains; eroded means that 3 to 7 inches of the surface layer remains; severely eroded means that less than 3 inches of the surface layer remains.

Glacial till. Unassorted, unstratified sediment carried or deposited by glacial ice.

Gleyed soil. A soil in which waterlogging and lack of oxygen have caused the material in one or more horizons to be neutral gray in color. The term "gleyed" is applied to soil horizons with yellow and gray mottling caused by intermittent waterlogging.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, and covered by grass for protection against erosion; used to conduct surface water away from cropland.

Green manure catch crop. A crop that is plowed under while green for its beneficial effect on the soil.

Horizon, soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes. These are the major horizons:

O horizon. The layer of organic matter on the surface of a mineral soil, this layer consists of decaying plant residues.

A horizon. The mineral horizon at the surface or just below an O horizon. This horizon is the one in which living organisms are most active and therefore is marked by the accumulation of humus. The horizon may have lost one or more of soluble salts, clay and sesquioxides (iron and aluminum oxides).

B horizon. The mineral horizon below an A horizon. The B horizon is in part a layer of chance from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or some combination of these; (2) by prismatic or blocky structure; (3) by redder or stronger colors than the A horizon; or (4) by some combination of these. Combined A and B horizons are usually called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon. The weathered rock material immediately beneath the solum. In most soils this material is presumed to be like that from which the overlying horizons were formed. If the material is known to be different from that in the solum, a Roman numeral precedes the letter C.

R layer. Consolidated rock beneath the soil. The rock usually underlies a C horizon but may be immediately beneath an A or B horizon.

Interpretations, soil. The use of soil properties to predict soil behavior under specific soil uses, e.g., one soil may have such low permeability that septic tanks will not function well, while another soil may have moderate permeability and septic tanks will function properly.

Lime concretion. An aggregate cemented by the precipitation of calcium carbonate ($CaCO_3$).

Loess. Mineral material transported by wind and consisting of predominantly silt-sized particles.

Mottled. Irregularly marked with spots of different colors (usually browns and grays) that vary in number and size. Mottling in soils usually indicated poor aeration and lack of drainage. Descriptive terms are as follows: Abundance - few, common, and many; size - fine, medium, and coarse; and contrast - faint, distinct, and prominent. The size measurements are these: fine, less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; medium, ranging from 5 millimeters to 15 millimeters (about 0.2 to 0.6 inch) in diameter along the greatest dimension; and coarse, more than 15 millimeters (about 0.6 inch) in diameter along the greatest dimension.

Organic matter (content). A general term for plant and animal material in or on the soil, in all stages of decomposition. Readily decomposed organic matter is often distinguished from the more stable forms that are past the stage of rapid decomposition. Average organic matter contents in surface horizons are reported in this publication as percent by weight for cultivated soils or for virgin soils as if they were cultivated.

Outwash, glacial. The material swept out, sorted, and deposited beyond the glacial ice front by streams of melt water.

Ped. An individual natural soil aggregate, such as a crumb, a prism, or a block, in contrast to a clod.

Phase, soil. A subdivision of a soil series, or other unit in the soil classification system, made because of differences in the soil that affect its management but do not affect its classification in the natural landscape. A soil type, for example, may be divided into phases because of differences in slope, stoniness, thickness, or some other characteristic that affects its management but not its behavior in the natural landscape.

Porosity, soil. The degree to which the soil mass is permeated with pores or cavities.

Profile, soil. A vertical section of the soil through all its horizons and extending into the parent material.

Permeability, soil. The quality of a soil that enables it to transmit air and water. The following relative classes of soil permeability, used in this soil survey, refer to estimated rates of movement of water in inches per hour:

	Inches per hour
Very slow	Less than 0.06
Slow	0.06 - 0.20
Moderately slow	0.20 - 0.63
Moderate	0.63 - 2.00
Moderately rapid	2.00 - 6.3
Rapid	6.3 - 20.0

Reaction, soil. The degree of acidity or alkalinity of a soil expressed in pH values. A soil that tests to pH 7.0 is precisely neutral in reaction because it is neither acid nor alkaline. An acid or "sour" soil is one that gives an acid reaction; an alkaline soil is one that is alkaline in reaction. In words, the degrees of acidity or alkalinity are expressed thus:

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Sand. Individual rock or mineral fragments in soils having diameters ranging from 0.05 to 2.0 millimeters. Most sand grains consist of quartz, but they may be any mineral composition. The textural class name of any soil that contains 85 percent or more sand and not more than 10 percent clay.

Series, soil. A group of soils that developed from a particular type of parent material and have genetic horizons that, except for texture of the surface layer, are similar in differentiating characteristics and in arrangement in the profile.

Silt. Individual mineral particles in a soil that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). Soil of the silt textural class is 80 percent or more silt and less than 12 percent clay.

Slope. The inclination of a surface from the horizontal. Slope of mapping units is expressed in percent, e.g., a one-foot rise in 100 feet horizontal travel is a 1-percent slope. Following are the slope classes and names used in this survey:

Slope symbol	Slope range (%)	Slope name
A	0-2	Level or nearly level
B	2-4	Very gently sloping
C	4-7	Gently sloping
D	7-12	Moderately sloping
E	12-18	Strongly sloping
F	18-30	Moderately steep
G	30+	Steep

Soil. A natural, three-dimensional body on the earth's surface that supports plants and that has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil mapping unit. An individual area or delineation on the soil map, consisting of a soil with a defined range of slope and amount of previous erosion. In some places, up to about 15 percent of the mapping unit may consist of a different kind of soil. Such areas are called "mapping inclusions" because they cannot be feasibly separated and shown on the soil maps because of the scale of the maps.

Solum. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in mature soil includes the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristic of the soil are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. The principal forms of soil structure are: *platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. Structure-less soils are (1) single grain (each grain by itself, as in dune sand) or (2) massive (the particles adhering together without any regular cleavage, as in many claypans and hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. Technically the part of the soil below the solum.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 8 inches in thickness. The plowed layer.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surplus runoff so that it may soak into the soil or flow slowly to a prepared outlet without harm. Terraces in fields are generally built so they can be farmed. Terraces intended mainly for drainage have a deep channel that is maintained in permanent sod.

Terrace, stream. An area of soils, often called a "second bottom", that is formed from alluvial material deposited by nearby streams, but now seldom if ever floods.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand*, *loamy sand*, *sandy loam*, *loam*, *silt loam*, *silt*, *sandy clay loam*, *clay loam*, *silty clay loam*, *sandy clay*, *silty clay*, *and clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Tilth, soil. The condition of the soil in relation to the growth of plants, especially soil structure. Good tilth refers to the friable state and is associated with high non-capillary porosity and stable, granular structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Water table. The highest part of the soil or underlying rock material that is wholly saturated with water. In some places an upper, or perched, water table may be separated from a lower one by a dry zone.

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CONVENTIONAL SIGNS

WORKS AND STRUCTURES

Interstate

Primary Paved Road

Secondary Paved Road

Graveled or Oiled Road

Improved Dirt Road

Secondary Dirt and Private Road

Interstate—I-74; Federal—U.S. Rt. 150; State—ILL. Rt. 130

Railroad, Single Tract

Railroad, Double or Multiple Tract

House

School

Business Establishment

Cemetery

Borrow Pit

Gravel Pit

BOUNDARIES

Section

Town or City

DRAINAGE

Large Perennial Stream

Small Perennial Stream

Uncrossable Drainageway

Crossable Drainageway

Lakes and Ponds

Wet Spot

SOIL SURVEY DATA

Soil Boundary and Symbol

Made Land

M.L.

SOIL MAP SYMBOL LEGEND

SOIL SYMBOLS

No.	Soil Type
24	Dodge silt loam
25	Hennepin loam
27	Miami silt loam
56	Dana silt loam
60	LaRose silt loam
67	Harpster silty clay loam
76	Otter silt loam
103	Houghton muck
104	Virgil silt loam
105	Batavia silt loam
107	Sawmill silty clay loam
132	Starks silt loam
134	Camden silt loam
136	Brooklyn silt loam
145	Saybrook silt loam
148	Proctor silt loam
149	Brenton silt loam
152	Drummer silty clay loam
154	Flanagan silt loam
171	Catlin silt loam
198	Elburn silt loam
199	Plano silt loam
207	Ward silt loam
221	Parr silt loam
233	Birbeck silt loam
234	Sunbury silt loam
236	Sabina silt loam
242	Kendall silt loam
243	St. Charles silt loam
291	Xenia silt loam
322	Russell silt loam
330	Peotone silty clay loam
353	Toronto silt loam
385	Atlanta silt loam*
451	Lawson silt loam
481	Raub silt loam
496	Fincastle silt loam

* Atlanta is an uncorrelated series as of the date of this survey.

SLOPE SYMBOLS

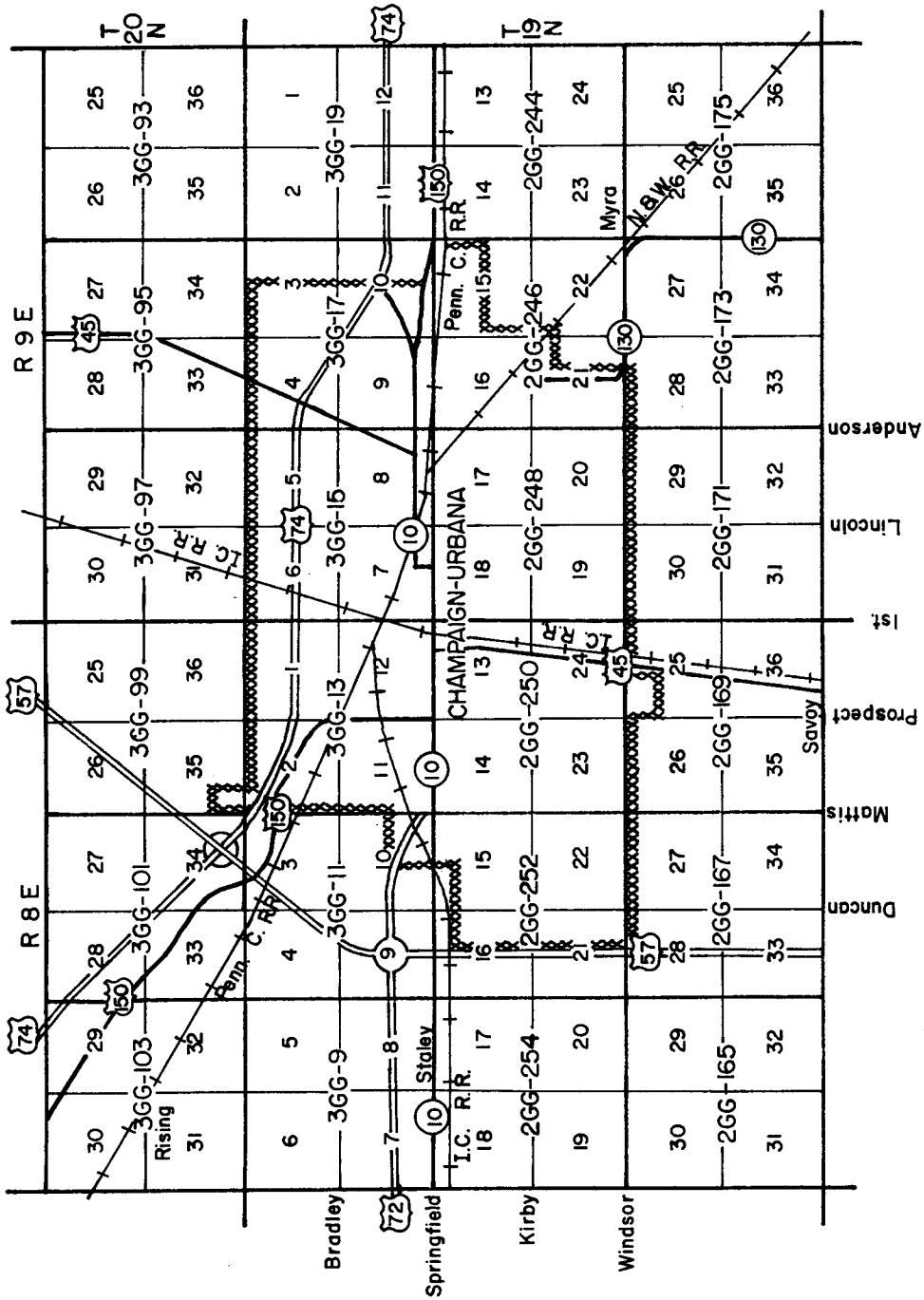
A - 0 to 2 percent slopes
B - 2 to 4 percent slopes
C - 4 to 7 percent slopes
D - 7 to 12 percent slopes
E - 12 to 18 percent slopes
F - 18 to 30 percent slopes

EROSION SYMBOLS

- If no erosion symbol is used, the soil is uneroded or slightly eroded.

2 - Moderately eroded soil; only 3 to 7 inches of the original surface soil remain.

3 - Severely eroded soil; less than 3 inches of the original surface soil remain.



Index to soil map sheets of the Champaign-Urbana area.

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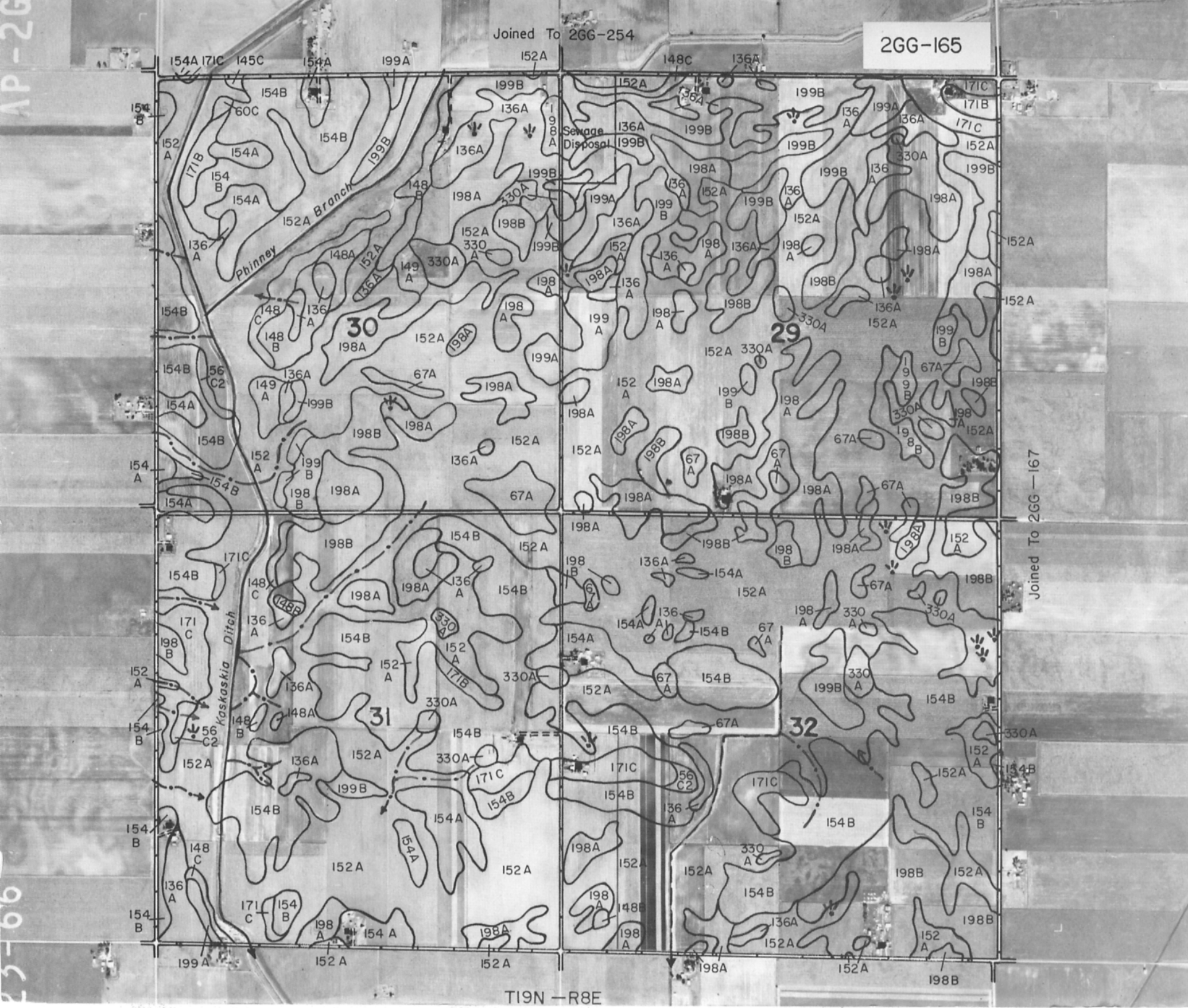
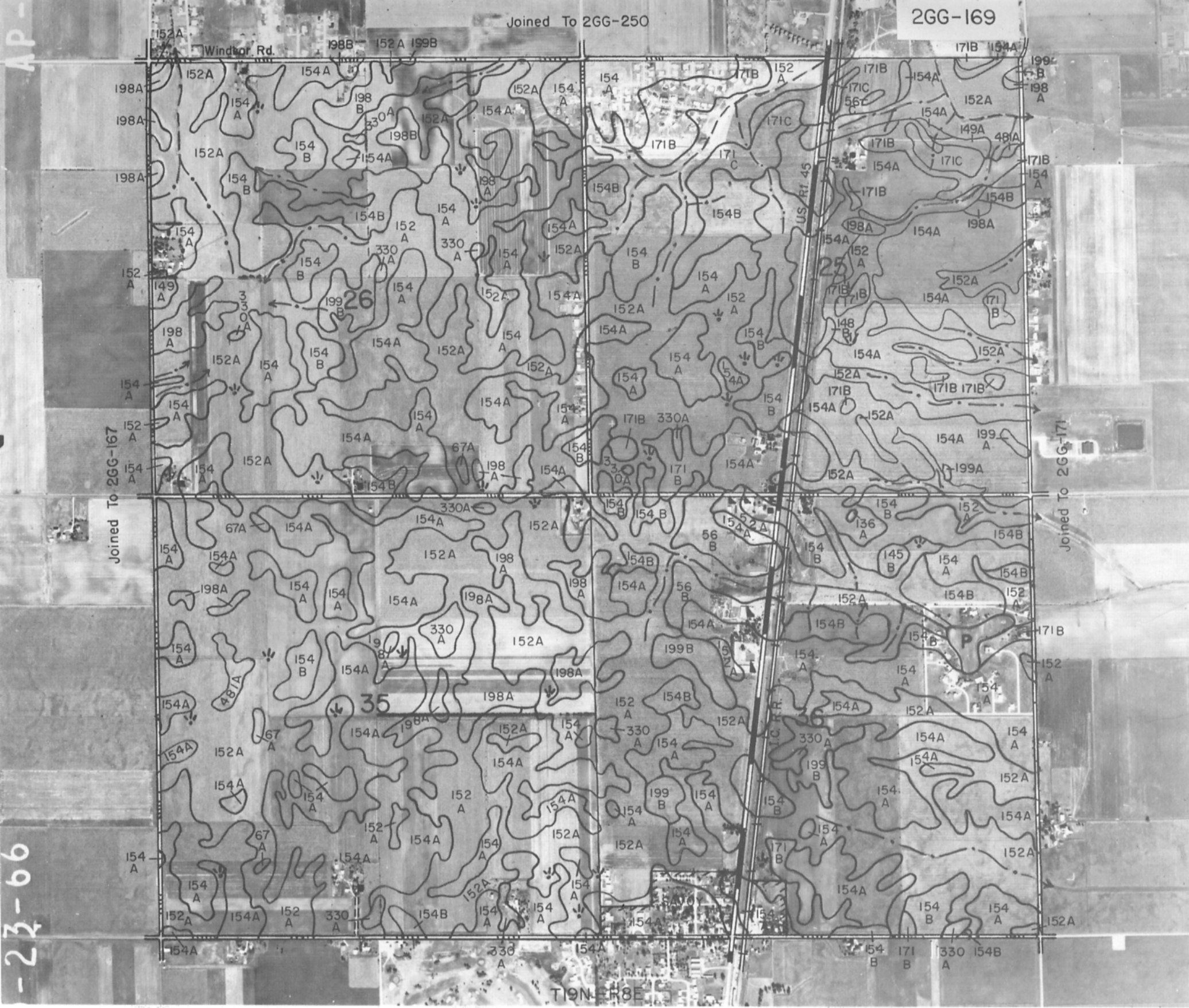
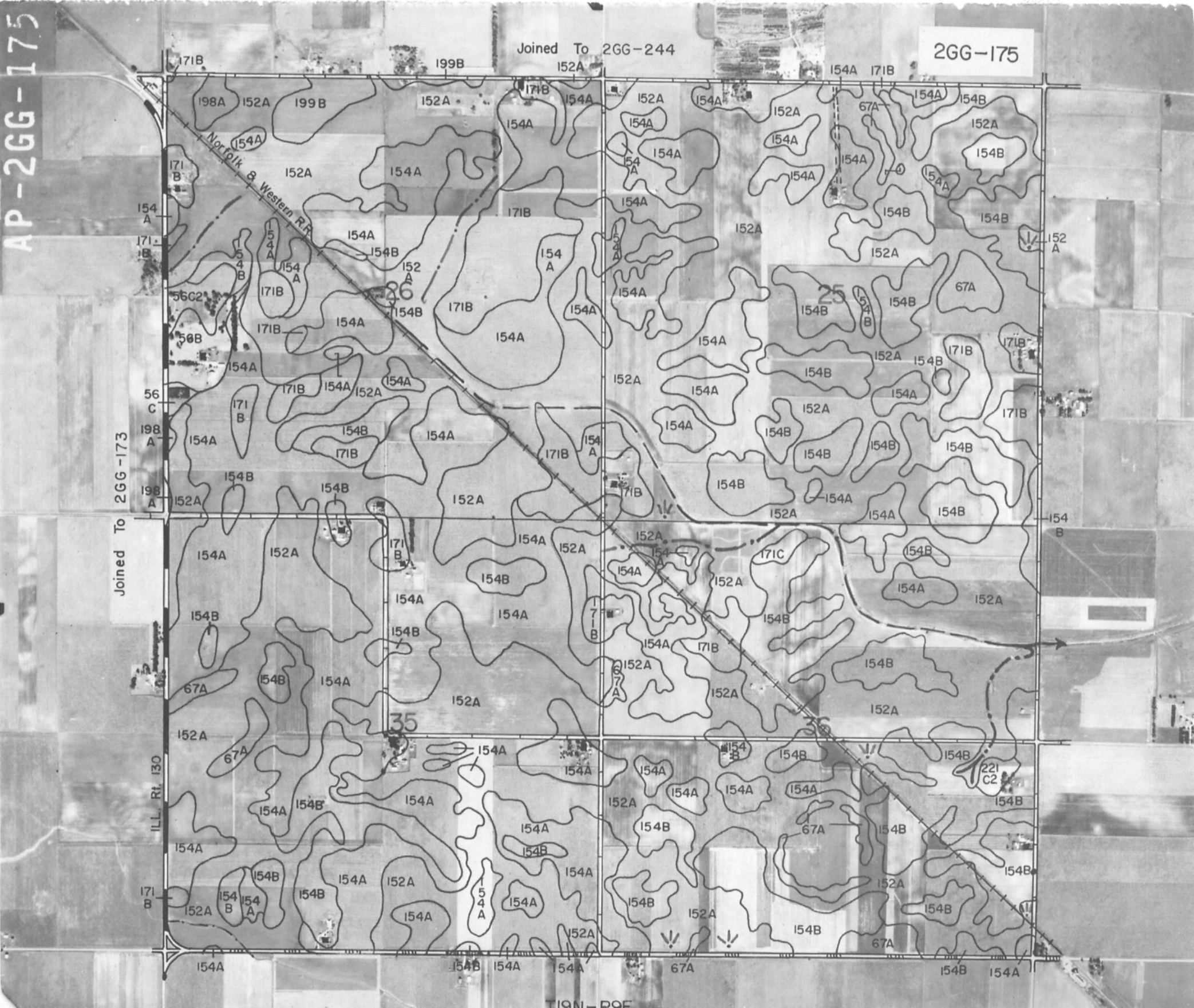

2GG-165
Joined To 2GG-254
Joined To 2GG—167
Sewage Disposal
Phinney Branch
Kaskaskia Ditch
30
29
31
32
T19N — R8E

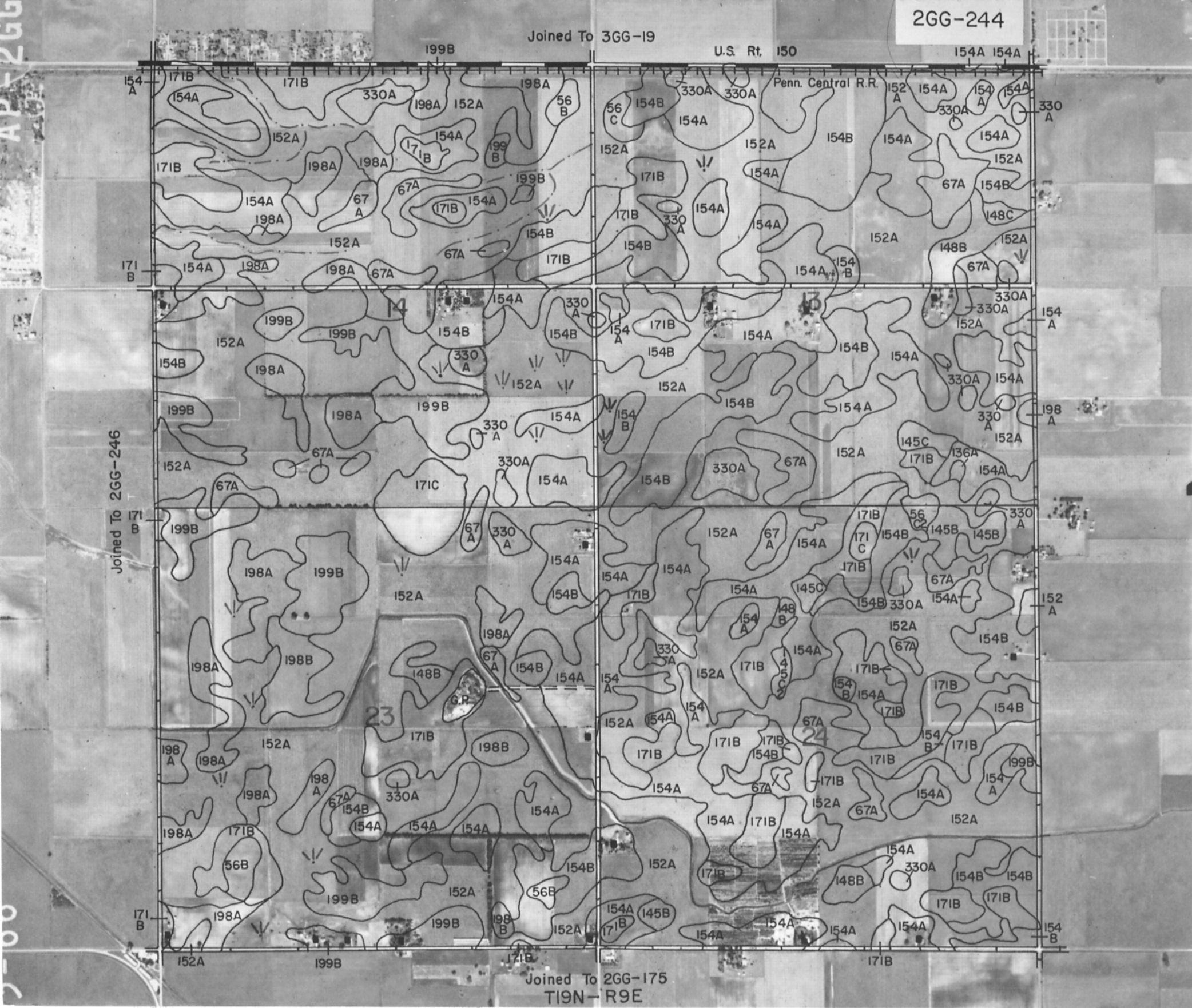
2GG-167
Joined To 2GG-252
Joined To 2GG-65
Joined To 2GG-169
2GG-66
Kaskaskia Ditch
I-57
T19N—R8E
27
34
33


2GG-169
Joined To 2GG-250
Windsor Rd.
Joined To 2GG-167
Joined To 2GG-171
US Rt. 45
26
25
35
36
T19N-R8E
AP-23-66

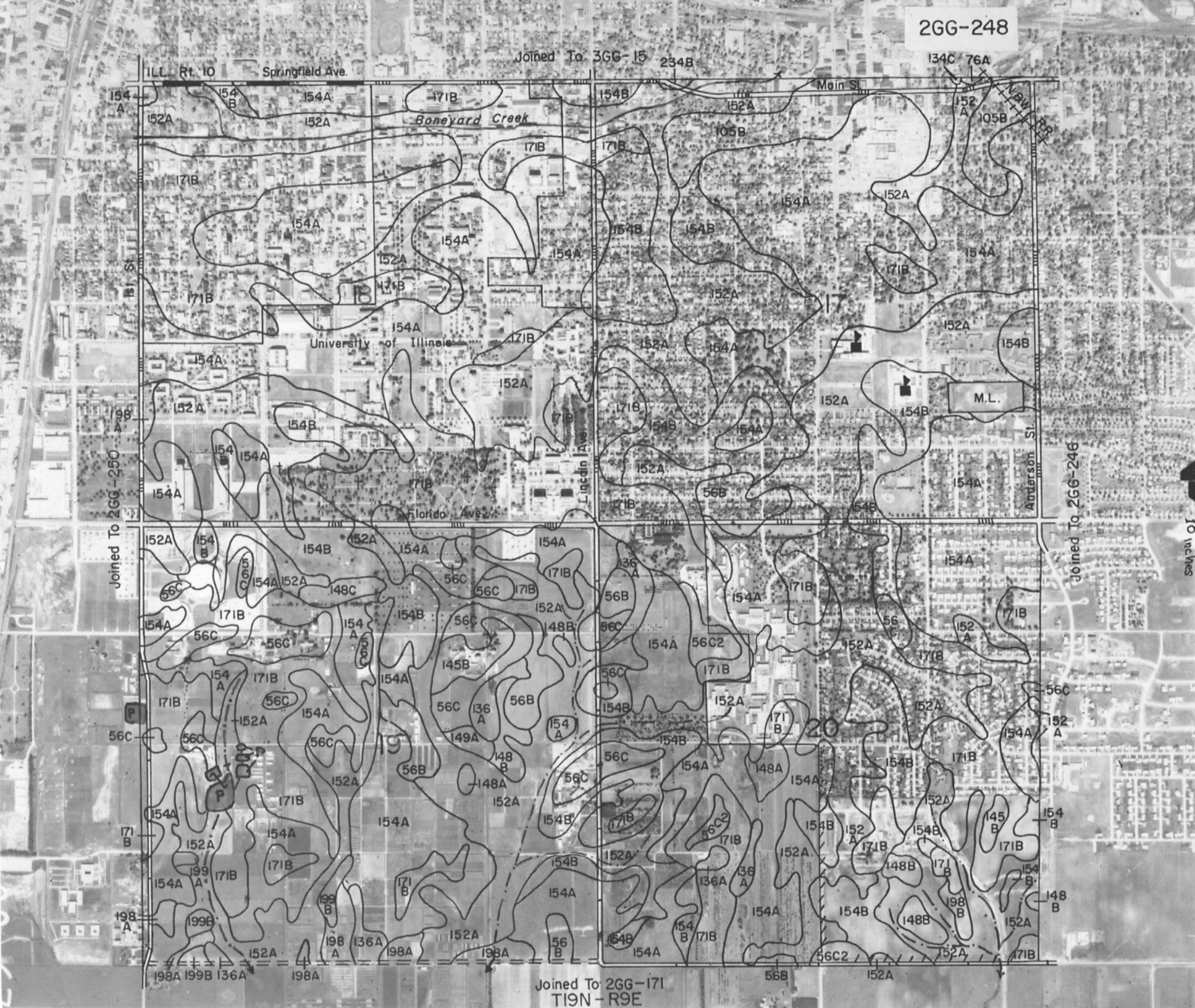
2GG-171
Joined To 2GG-248
Joined To 2GG-169
Joined To 2GG-173
T19N-R9E
Embarras River
30
31
32
P

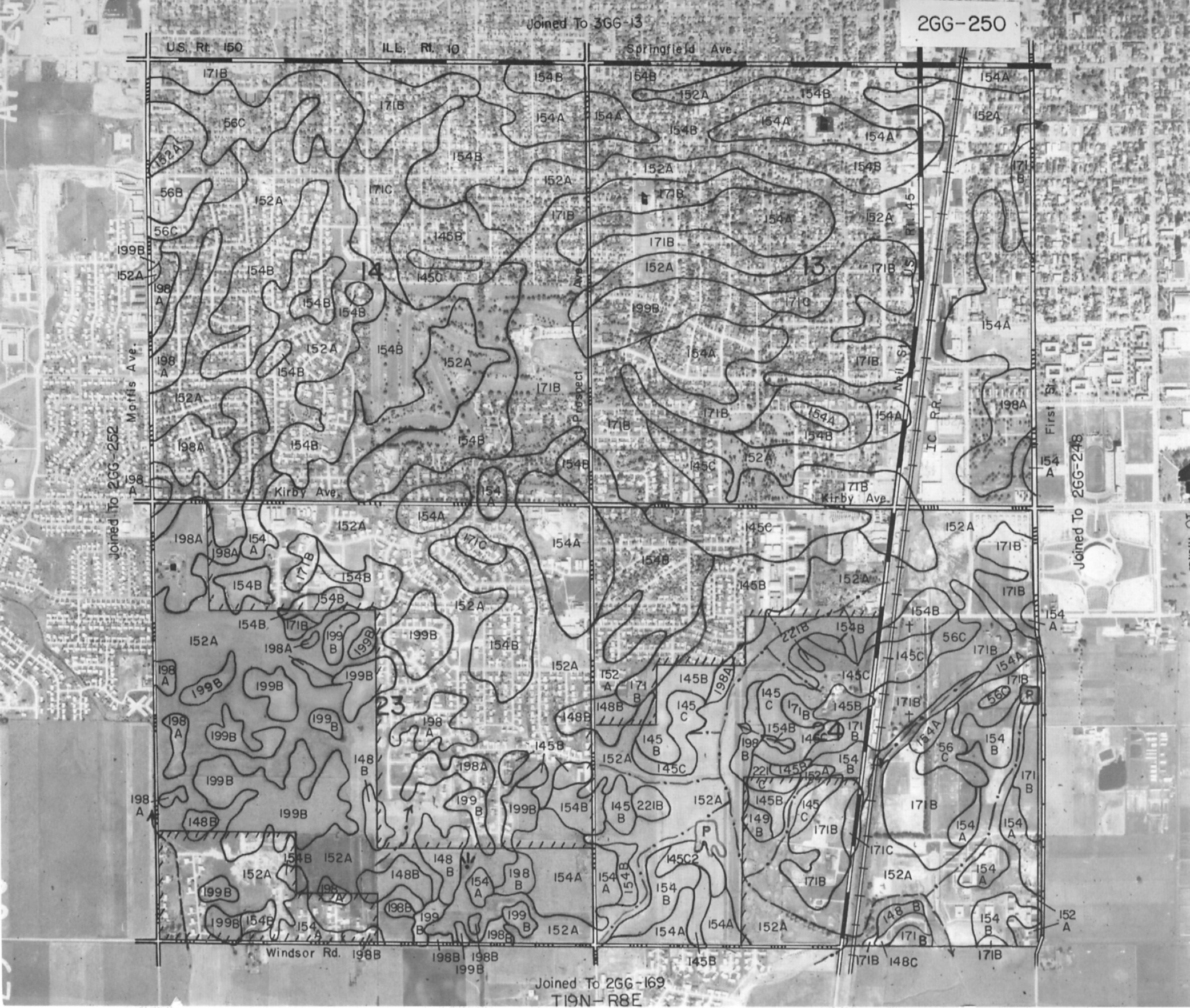
AP-2GG-173
2GG-173
Joined To 2GG-246
ILL. Rt. 130
Joined To 2GG-171
Joined To 2GG-175
T19N—R9E
28
27
34


2GG-175
Joined To 2GG-244
Joined To 2GG-173
ILL. Rt. 130
Norfolk & Western R.R.
T19N-R9E
171B
199B
198A
152A
154A
154B
171C
67A
56C2
56B
221C2
25
26
35
36

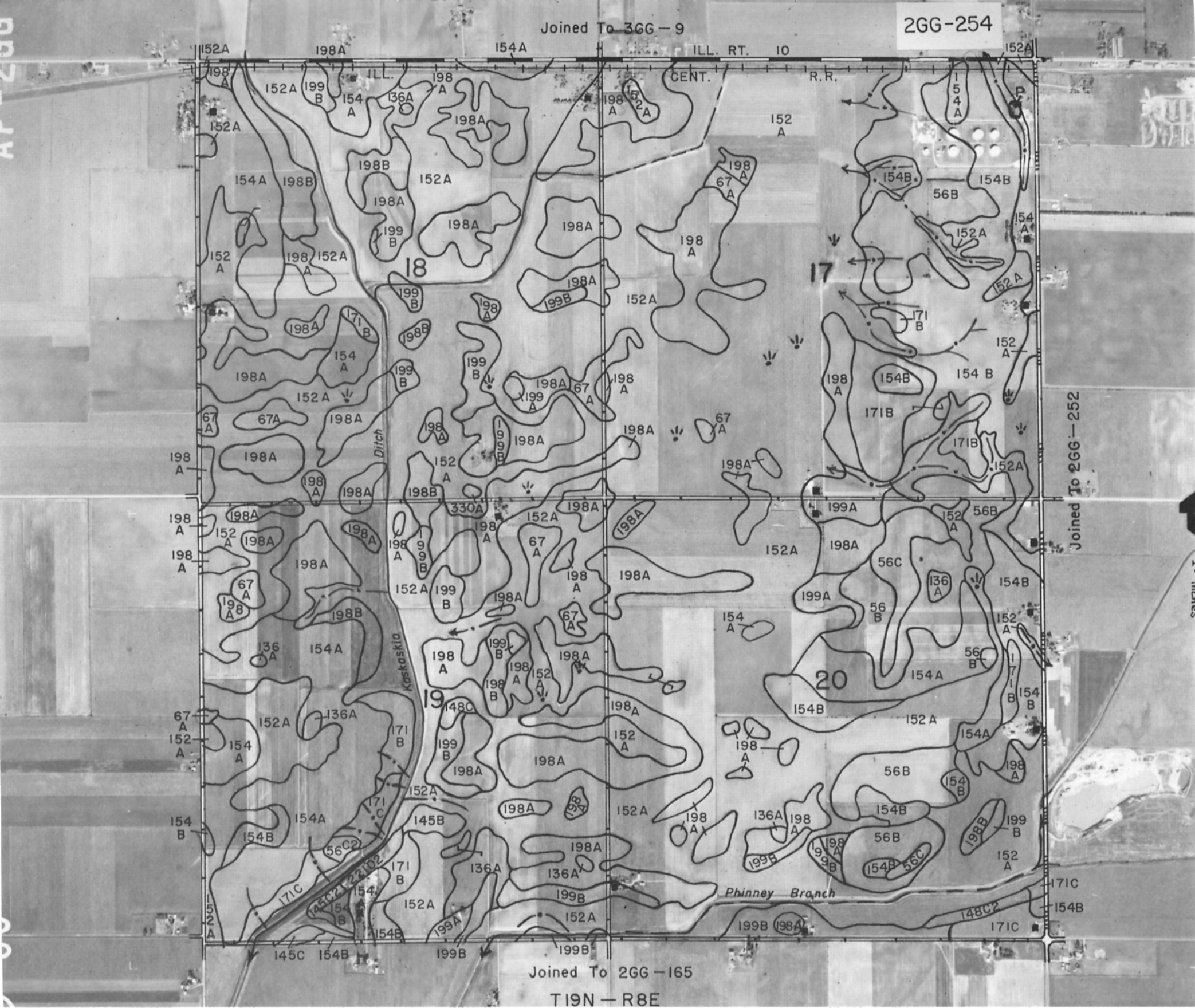

2GG-244
Joined To 3GG-19
U.S. Rt. 150
Penn. Central R.R.
Joined To 2GG-246
Joined To 2GG-175
T19N-R9E
14
13
23
24
G.R.

2GG-246
Joined To 3GG-17
Main St.
P.C. R.R.
Florida Ave.
N&W R.R.
Joined To 2GG-244
Joined To 2GG-245
Joined To 2GG-173
ILL. Rt. 130
T19N - R9E


2GG-248
Joined To 3GG-15
ILL. Rt. 10
Springfield Ave.
Main St.
Boneyard Creek
University of Illinois
Florida Ave.
Lincoln Ave.
Anderson St.
1st St.
M.L.
Joined To 2GG-250
Joined To 2GG-246
Joined To 2GG-171
T19N-R9E
10 inches


2GG-250
Joined To 3GG-13
U.S. Rt. 150
ILL. Rt. 10
Springfield Ave.
Joined To 2GG-252
Mathis Ave.
Prospect Ave.
Neil St.
IC R.R.
First St.
Joined To 2GG-248
Kirby Ave.
Windsor Rd.
Joined To 2GG-169
T19N-R8E
13
14
23
24

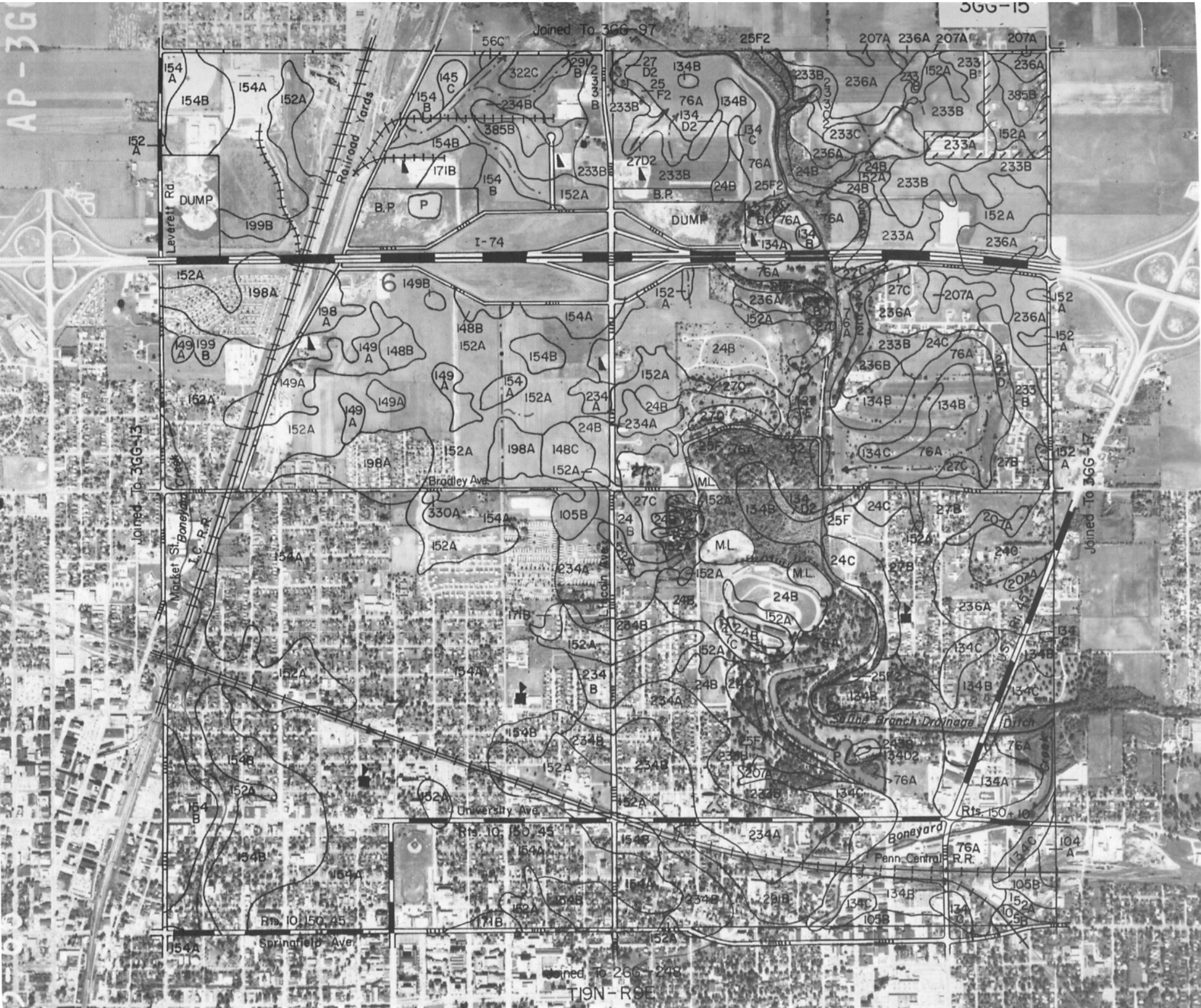
2GG-252
Joined To 3GG-11
I.C.R.R.
Staley
Springfield Ave.
ILL. Rt. 10
Joined To 2GG-254
Joined To 2GG-250
Copper Slough
Duncan Rd.
Kirby Ave.
Maynard
M.L.
Lake
Phinney Branch
Windsor Rd.
Mattis Ave.
Joined To 2GG-167
T19N-R8E
I57
15
16
21
22

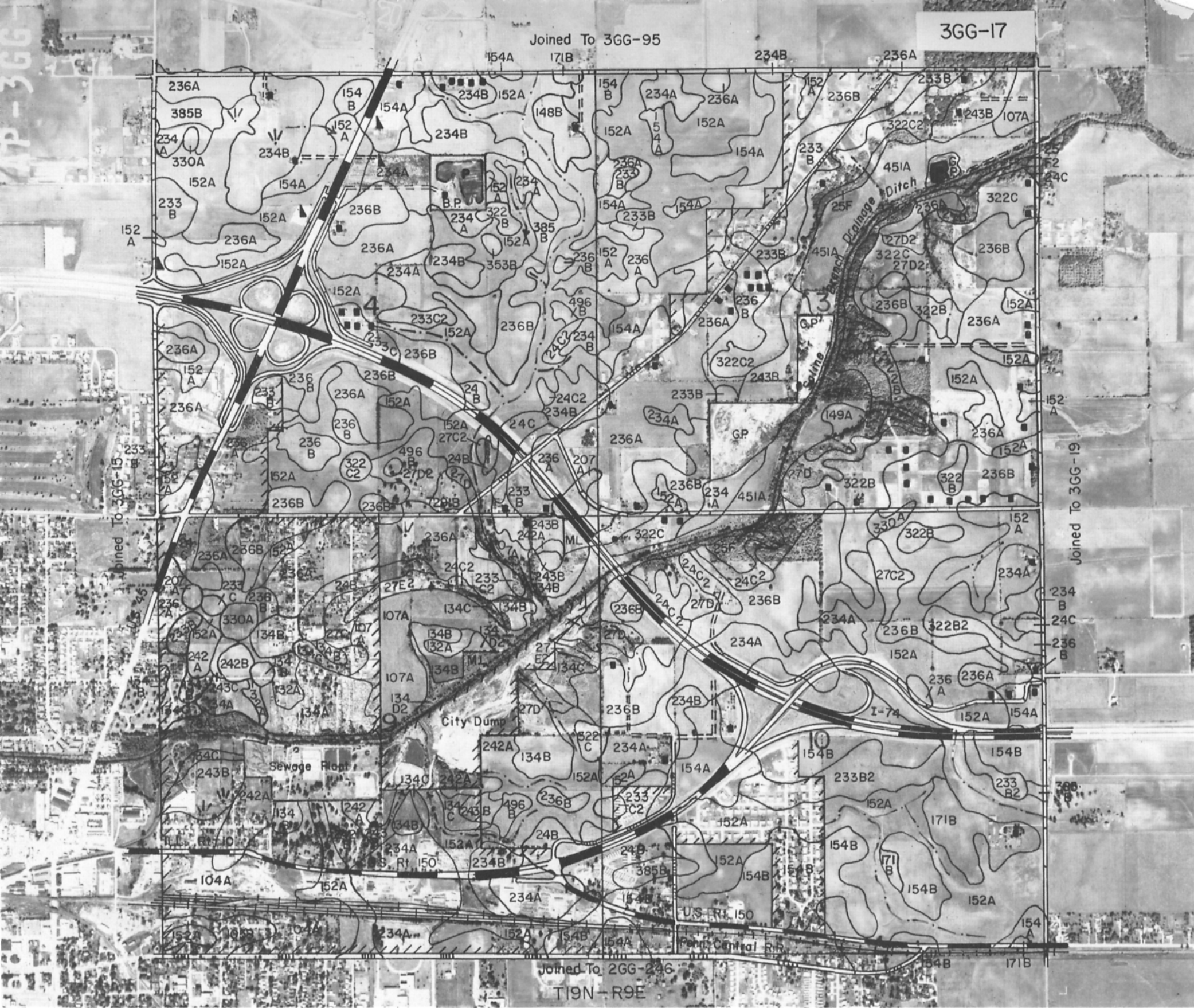

2GG-254
Joined To 3GG-9
ILL. RT. 10
ILL. CENT. R.R.
Joined To 2GG-252
Joined To 2GG-165
T19N—R8E
Ditch
Kaskaskia
Phinney Branch
18
17
19
20

3GG-9
Joined To 3GG-103
Joined To 3GG-11
Joined To 2GG-254
T19N-R8E
Bradley Avenue
Springfield Avenue
ILL. Rt. 10
I-72
Kaskaskia Ditch
5
6
7
8

Joined To 3GG-101
3GG-11
AP-3
Joined To 3GG-9
Joined To 3GG-13
Bradley
Parkland College
Water Treatment Plant
Penn. Central R.R.
U.S. Rt. 150
I-57
I-72
Mattis Avenue
Duncan Road
Stoley
Springfield Avenue
ILL. Rt. 10
G.P.
T.C.
R.R.
Joined To 2GG-252
T19N-R8E
23-66

3GG-13
Joined To 3GG-99
Joined To 3GG-11
Joined To 3GG-15
Joined To 2GG-250
T19N-R8E
Avenue
Bradley
Avenue
Mattis
Prospect
Avenue
Springfield
Avenue
Leverett
Road
Market
Street
First
Street
Neil
Street
U.S. Rt. 150
I-74
Penn. Central R.R.
ILL. CENT. R.R.
Boneyard Creek
U.S. Rt. 150 & ILL. Rt. 10
1
2
11
12


3GG-15
AP-3GG
Joined To 3GG-97
Railroad Yards
Leverett Rd.
DUMP
I-74
B.P.
P
Joined To 3GG-13
Market St.
Boneyard
I.C. R.R.
Creek
Bradley Ave.
Lincoln Ave.
M.L.
Joined To 3GG-17
Spoon Branch Drainage Ditch
University Ave.
Rts. 10, 150, 45
Springfield Ave.
Boneyard
Penn Central R.R.
Rts. 150 + 10
Joined To 266-248
T19N - R9E


3GG-17
Joined To 3GG-95
Joined To 3GG-15
Joined To 3GG-19
Joined To 2GG-246
T19N-R9E
City Dump
Sewage Plant
Saline Branch Drainage Ditch
I-74
U.S. Rt. 150
Penn. Central R.R.
B.P.
G.P.
ML
4
3
9
10

3GG-19
Joined To 3GG-93
Joined To 3GG-17
Joined To 2GG-244
T19N-R9E
Salina Branch Drainage Ditch
Penn. Central R.R.
U.S. Rt. 150
I-74
AP-3GG-1

3GG-93
26
25
35
36
Joined To 3GG-95
Joined To 3GG-19
T20N-R9E

3GG-95
Joined To 3GG-97
Joined To 3GG-93
Joined To 3GG-17
T20N - R9E
US Rt. 45
ILLINI AIRPORT
28
27
33
34
ML

3GG-97
Joined To 3GG-99
Joined To 3GG-95
Joined To 3GG-15
T20N - R9E
Leverett Road
Illinois Central Railroad Yard
I.C. R.R.
Wilbur Heights
C & J Forging Co.
Junk Yard
Fill
Saline Branch
Drainage Ditch
30
29
31
32
AP-3
-23-66

3GG-99
AP-3
Joined To 3GG-101
Fisher Road
Leverett Road
Joined To 3GG-97
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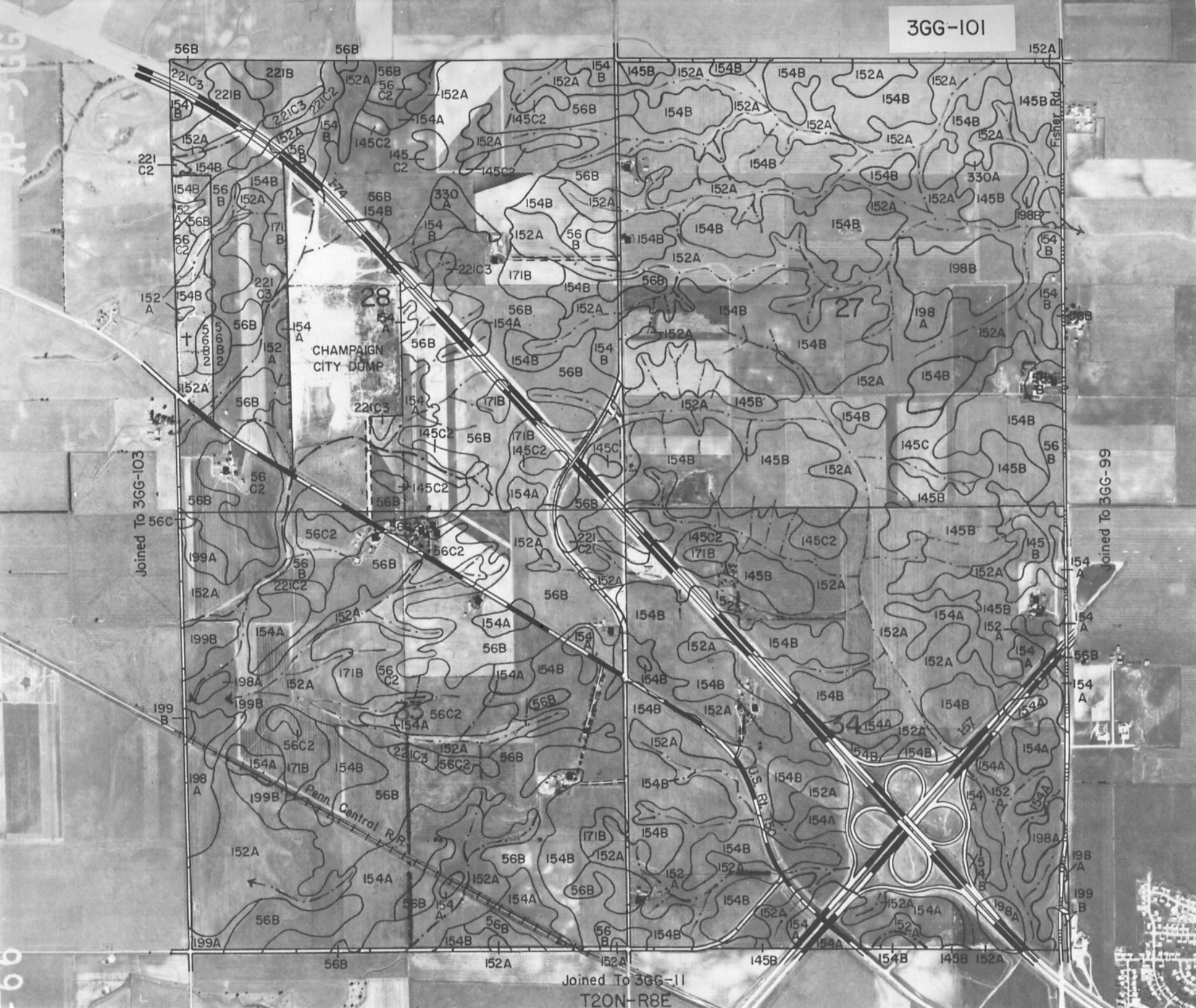
Joined To 3GG-13
T20N-R8E


3GG-101
CHAMPAIGN CITY DUMP
Penn Central R/R
U.S. Rt. 150
I-74
I-57
Fisher Rd.
Joined To 3GG-103
Joined To 3GG-99
Joined To 3GG-11
T20N-R8E
28
27
33
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AP-3GG-
3GG-103
174
US Rt. 150
Penn. Central R.R.
Kaskaskia Ditch
30
29
31
32
RISING
Joined To 3GG-101
Joined To 3GG-9
T20N-R8E
3-66